

SMITHSONIAN INSTITUTION  
ASTROPHYSICAL OBSERVATORY

Research in Space Science

SPECIAL REPORT

Number 158

N64-33182

(ACCESSION NUMBER)		(THRU)
35		
(PAGES)		
NASA CR 58841		(CODE)
(NASA CR OR TMX OR AD NUMBER)		68
		(CATEGORY)

SATELLITE ORBITAL DATA  
No. E-4

OTS PRICE

XEROX \$ 2.00 F.S.

MICROFILM \$ .50 MF.

July 10, 1964

CAMBRIDGE, MASSACHUSETTS 02138

SAO Special Report No. 158

SATELLITE ORBITAL DATA

No. E-4

Material prepared under the supervision of I. G. Izsak,  
Chief, Research and Analysis Division

Smithsonian Institution  
Astrophysical Observatory

Cambridge, Massachusetts 02138

TABLE OF CONTENTS

Orbital Information . . . . .	1
Orbital Elements . . . . .	3
Satellite 1959 Alpha 1 (Vanguard 2), July 1 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	3
Satellite 1959 Eta (Vanguard 3), July 1 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	6
Satellite 1960 Iota 2 (Echo 1 rocket), July 1 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	9
Satellite 1961 Delta 1 (Explorer 9), July 1 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	12
Satellite 1961 Omicron 1 (Transit 4A), July 19 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	15
Satellite 1961 Omicron 2 (Injun 3), July 19 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	18
Satellite 1961 Alpha Delta 1 (Midas 4), March 13 - December 31, 1962	
SAO smoothed elements . . . . .	20
SAO mean elements (P. Stern) . . . . .	24
Satellite 1962 Alpha Epsilon 1 (Telstar 1), July 17 - December 31, 1962	
SAO mean elements (P. Stern) . . . . .	29

## NOTE

It is in the nature of frequently used computer programs that from time to time they undergo modifications as dictated by the experience of people who use them. Thus our Differential Orbit Improvement Program, being in use since the end of 1958, has been changed on several occasions. In the past we did not give notice of any of these changes, because they affected merely the internal structure and the capabilities of the program. Some recent modifications, however, should be pointed out because they alter the definition of the mean orbital elements.

1. As before, the semimajor axis  $a$  of an orbit is being computed from the mean motion  $n$  of the satellite according to the formula

$$a = \sqrt[3]{\frac{GM}{n^2}} \left\{ 1 - \frac{J_2 a^2 E}{2p^2} \sqrt{1 - e^2} \left( 1 - \frac{3}{2} \sin^2 I \right) \right\}$$

(Y. Kozai, Astron. Journ., vol. 64, pp. 367-377; in his equation (14) we put  $A_2 = \frac{3}{2} J_2 a^2 E$ ). In the old program, the mean motion in turn was defined as

the time derivative of the mean anomaly  $M$ . Therefore in cases where in addition to a polynomial part the mean anomaly also had a trigonometric part, the program produced small but unwanted, long-periodic variations in the semimajor axis. In the new program the mean motion is defined as the time derivative of the mean anomaly's polynomial part only.

2. The old program provided internally only for those first-order short-periodic perturbations that are caused by the second zonal harmonic ( $J_2$ -term) of the geopotential. The new program has the optional capability to account for lunar perturbations with periods of approximately two weeks. Their analytical expressions are quite complicated and will not be given here. As a rule, we use this feature of the program only in connection with orbits that are computed from precisely reduced Baker-Nunn observations. In our future publications of satellite orbital data we will always mention if lunar perturbations were included in the computations.

A detailed write-up of the new Differential Orbit Improvement Program, henceforth called DOI-3, will be given shortly by Mr. Edward M. Gaposchkin.

## ORBITAL INFORMATION<sup>1</sup>

The orbital elements have been derived by the indicated staff members of the Satellite Tracking Program, Smithsonian Astrophysical Observatory, employing the SAO Differential Orbit Improvement Program (DOI).

As opposed to osculating elements, the elements presented here are mean elements in the sense that the effects of the short-period perturbations due to the earth's oblateness have been eliminated.

SAO mean elements have been derived from observations covering several days and are given in the form of a table. The successive sets of elements are essentially independent of each other. They are dependent, however, in the sense that high-order coefficients in the secular and the long-periodic terms are generally considered as known and as constant for periods of several weeks or months, as dictated by convenience.

The times of epoch in the mean elements are reckoned in Julian Days, but for the sake of convenience the number 2400000.5 has been subtracted to provide an abbreviated notation which we call "Modified Julian Days," or "MJD."

The units of the orbital elements are degrees for angular quantities, megameters ( $Mm = 10^6$  meters) for linear quantities, and revolutions for the mean anomaly  $M$  and its derivatives.

The tabulated values of the SAO mean elements give the values of arguments of perigee  $\omega$ ; right ascension of the ascending node  $\Omega$ ; inclination  $i$ ; eccentricity  $e$ ; and mean anomaly  $M$  as functions of time  $t = T - T_0$  (where  $T_0$  is the reference epoch) expressed in days. The two-digit number placed at the right of each value represents the standard error for that element and refers to the last digits given.

The same tabulation also gives the mean (anomalistic) motion  $n$ ; the orbital acceleration  $n'/2$  or  $n'(dn/dt)$ , and the semimajor axis  $a$  or the geocentric distance of perigee  $q$  (in megameters). Of the last three columns, the one headed  $N$  indicates the number of observations used for the computation of a set of elements; the one headed  $D$ , the number of days used; and the one headed  $\sigma$ , the standard error of the representation of the observations relative to their assumed accuracy.

SAO smoothed elements have been derived from observations covering about two weeks. They are given as functions of time and generally include both secular and periodic terms. The general expression for any element  $E$  is

$$E = E_0 + E_1 t + E_2 t^2 + \dots + A_i \sin(B_i + C_i t),$$

<sup>1</sup>This work was supported by grant NsG 87-60 from the National Aeronautics and Space Administration.

where  $t = T - T_0$  is again expressed in days. The presence of a standard error associated with a particular coefficient indicates that this quantity was determined by the process of differential orbit improvement; the absence of a standard error means that the quantity was taken from some other source.

In our computer program, the inclination and the argument of perigee are referred to the true equator of date; the right ascension of the ascending node, however, is reckoned from the mean equinox of 1950.0 along the corresponding mean equator to the intersection with the moving true equator of date, and then along the true equator of date. To transform from right ascension of the node as determined by the DOI to right ascension of the node referred to the mean equinox of date, one uses

$$\Omega^o = \Omega^o (\text{DOI}) + 3^{\circ}508 \times 10^{-5} (\text{MJD} - 33281) ,$$

where MJD stands for the Modified Julian Day of the date.

The mean (anomalistic) motion  $n$  can be obtained from the smoothed elements by differentiating the expression for  $M$ , and the orbital acceleration  $n'$  can be obtained by twice differentiating the same expression for  $M$ .

## SAO MEAN ELEMENTS

Satellite 1959 Alpha 1

1 July - 30 August 1962

T (MJD)	w	Ω	i	e	M	n	n'/2	q	N	D	σ
37846.0	148.371 4	183.421 1	32.8734 4	.16061 3	.89226 1	11.477847 4	.56E-6 18	6.933877	37	8	4.74
37848.0	158.942 2	176.379 1	32.8743 3	.16454 1	.847985 5	11.477842 2	-.69E-7 88	6.934431	28	0	2.16
37850.0	169.511 4	169.340 2	32.8755 4	.164429 9	.803699 9	11.477834 4	.14E-6 26	6.935361	38	8	4.60
37852.0	180.094 3	162.301 2	32.8770 4	.164340 6	.759374 5	11.477829 3	.14E-6 18	6.936106	48	8	4.83
37854.0	190.687 2	155.261 1	32.8782 3	.164258 3	.715031 3	11.477835 1	-.11E-6 12	6.936780	60	8	4.48
37856.0	201.275 1	148.2232 6	32.8797 2	.164178 2	.670689 2	11.477841 1	.62E-6 7	6.937447	58	8	3.00
37858.0	211.870 1	141.1844 6	32.8810 2	.164102 2	.626339 2	11.477846 1	.48E-6 9	6.938072	55	8	2.70
37860.0	222.473 1	134.1447 9	32.8822 2	.164046 3	.581970 3	11.477842 1	-.11E-6 7	6.938537	47	8	2.68
37862.0	233.073 1	127.1104 1	32.8836 2	.164011 3	.537596 3	11.477842 1	-.30E-6 10	6.938833	38	8	3.04
37864.0	243.6763 9	120.0740 7	32.8849 2	.163980 3	.493213 2	11.477841 1	-.51E-6 9	6.939092	26	8	1.89
37866.0	254.2878 9	113.0355 8	32.8856 2	.163960 3	.448807 2	11.4778266 8	-.135E-5 7	6.939263	32	8	2.20
37868.0	264.902 1	106.000 1	32.8846 4	.163956 5	.404378 3	11.477859 2	.29E-5 1	6.939279	40	8	4.21
37870.0	275.498 1	98.9609 9	32.8853 4	.163954 4	.360032 2	11.477872 2	.4E-7 24	6.939296	37	8	2.34
37872.0	286.105 1	91.923 1	32.8847 5	.163969 5	.315647 3	11.4778492 9	-.185E-5 9	6.939178	38	8	3.77
37874.0	296.7067 9	84.8847 8	32.8848 3	.163993 3	.271258 2	11.4778404 7	-.92E-6 7	6.938985	29	8	2.45
37876.0	307.308 1	77.8451 7	32.8852 3	.164022 4	.226871 2	11.4778385 7	-.76E-6 12	6.938739	33	8	2.70
37878.0	317.909 1	70.8068 6	32.8846 3	.164074 3	.182479 2	11.4778329 8	-.73E-6 7	6.938309	38	8	3.09
37880.0	328.5079 8	63.7686 4	32.8838 3	.164145 3	.138089 2	11.4778238 9	-.101E-5 6	6.937728	42	8	2.42
37882.0	339.1054 7	56.7305 3	32.8830 2	.164224 3	.093696 2	11.4778178 6	-.109E-5 5	6.937069	45	8	2.24
37884.0	349.7002 7	49.6924 3	32.8814 2	.164315 4	.049303 2	11.477815 1	-.68E-6 9	6.936319	38	8	1.98
37886.0	.288 1	42.6549 4	32.8806 3	.164402 8	.004918 3	11.477810 2	-.11E-5 2	6.935597	32	8	2.36
37888.0	10.887 9	35.6171 4	32.8804 3	.16449 2	.96048 3	11.47778 1	-.12E-5 1	6.934915	30	8	1.31
37890.0	21.42 2	28.574 2	32.876 1	.16461 4	.91628 9	11.47788 4	-.94E-6 19	6.933850	38	8	2.45
37892.0	31.98 2	21.538 1	32.8774 4	.16468 3	.87195 7	11.47780 2	-.81E-6 17	6.933274	46	8	2.37
37894.0	42.54 1	14.4969 9	32.8761 3	.16474 2	.82763 5	11.47779 2	-.44E-6 14	6.932838	51	8	2.84
37896.0	53.106 8	7.456 1	32.8752 3	.16478 2	.78328 3	11.47777 2	-.19E-6 19	6.932510	48	8	3.02
37898.0	63.678 3	.416 1	32.8747 3	.164791 6	.738890 9	11.47780 2	-.15E-6 17	6.932370	42	8	3.28
37900.0	74.232 2	353.376 1	32.8746 2	.164828 6	.694574 3	11.4778034 8	-.30E-6 20	6.932063	39	8	3.45
37902.0	84.784 2	346.337 1	32.8744 2	.164860 7	.650256 5	11.477806 2	-.94E-6 17	6.931962	51	8	3.71
37904.0	95.331 1	339.2982 8	32.8744 2	.164840 5	.605947 2	11.477801 1	-.46E-6 12	6.931964	62	8	3.79
37906.0	105.8792 9	332.2600 7	32.8745 2	.164808 6	.561624 2	11.477801 9	-.44E-6 10	6.932234	70	8	4.28

T (MJD)	$\omega$	$\Omega$	i	e	M	n	$n^{1/2}$	q	N	D	O
37908.0	116.4281 9	325.22208 7	32.8748 2	-164761 4	-517303 2	11.4778030 8	.77E-6 8	6.932622	70	8	3.87
37910.0	126.982 1	318.1815 8	32.8754 2	-164697 5	.472976 2	11.4778018 9	.29E-6 6	6.933153	65	8	4.35
37912.0	137.539 1	311.1432 8	32.8762 2	-164625 4	.428639 3	11.4778010 9	.40E-6 9	6.933753	61	8	3.94
37914.0	148.105 2	304.103 1	32.8771 2	-164552 5	.384289 3	11.477801 1	.61E-6 5	6.934356	60	8	3.91
37916.0	158.680 3	297.063 1	32.8784 3	-164479 7	.339922 5	11.477802 2	.98E-6 5	6.934960	50	8	3.59
37918.0	169.28 1	290.025 1	32.8791 3	-164445 3	.295522 2	11.477793 6	.126E-5 6	6.935212	36	8	3.33
37920.0	179.86 2	282.985 2	32.8806 8	-16429 4	.25117 3	11.477814 9	.156E-5 9	6.936510	35	8	4.59
37922.0	190.428 5	275.947 2	32.8814 8	-16422 1	.206796 9	11.477820 4	.55E-6 16	6.937118	33	8	5.84
37924.0	201.016 2	268.9092 8	32.8824 7	-16413 1	.162418 6	11.477824 3	.36E-6 24	6.937835	38	8	5.40
37926.0	211.610 2	261.8720 6	32.8834 6	-16406 1	.118027 6	11.477821 3	-.12E-6 16	6.938417	42	8	4.62
37928.0	222.211 1	254.8343 6	32.8835 4	-163991 7	.073613 5	11.477826 2	.17E-5 2	6.939006	45	8	4.06
37930.0	232.8116 2	247.7956 8	32.8831 4	-16393 1	.029207 5	11.477832 3	.11E-5 1	6.939534	52	8	3.60
37932.0	243.4173 7	240.7591 6	32.8838 2	-163886 4	.984814 3	11.477835 1	.20E-6 9	6.939873	53	8	2.30
37934.0	254.0245 8	233.722 1	32.8843 2	-163849 5	.940408 4	11.477836 2	.37E-6 9	6.940177	60	8	2.62
37936.0	264.6307 8	226.684 1	32.8844 2	-163820 5	.896011 4	11.477844 2	.67E-6 8	6.940415	63	8	2.26
37938.0	275.2382 9	219.6460 9	32.8845 1	-163819 5	.851612 5	11.477850 2	.195E-5 7	6.940421	56	8	1.94
37940.0	285.844 1	212.605 1	32.8838 2	-163835 7	.807249 6	11.477855 2	.200E-5 7	6.940287	64	8	2.56
37942.0	296.450 1	205.5707 8	32.8831 1	-163840 5	.762877 4	11.477866 2	.141E-5 8	6.940240	76	8	2.22
37944.0	306.961 1	198.5276 5	32.8771 1	-164247 4	.718542 4	11.477871 2	.185E-5 5	6.939894	73	8	2.32
37946.0	317.542 2	191.4890 5	32.8774 1	-164240 4	.674221 5	11.477869 3	.22E-5 1	6.939485	73	8	2.19
37948.0	328.258 2	184.4579 4	32.8812 1	-163976 4	.629909 5	11.477874 2	.237E-5 6	6.939105	75	8	2.50
37950.0	338.860 2	177.4202 5	32.8800 1	-164030 4	.585622 6	11.477882 2	.269E-5 8	6.938654	65	8	2.77
37952.0	349.454 2	170.3827 5	32.8784 2	-164094 4	.541382 7	11.477891 4	.285E-5 8	6.938122	71	8	3.20
37954.0	.041 2	163.3443 5	32.8768 2	-164170 4	.497184 6	11.477910 3	.30E-5 1	6.937486	85	8	3.62
37956.0	10.626 2	156.3066 6	32.8752 2	-164249 4	.453018 8	11.477923 3	.28E-5 1	6.936825	83	8	3.77
37958.0	21.204 2	149.2676 4	32.8739 2	-164337 3	.408895 6	11.477940 2	.36E-5 1	6.936087	97	8	3.06
37960.0	31.775 2	142.2282 4	32.8726 2	-164428 2	.364824 5	11.477954 3	.340E-5 9	6.935322	103	8	3.08
37962.0	42.342 1	135.1887 5	32.8713 2	-164496 3	.320785 5	11.477965 2	.41E-5 1	6.934756	108	8	3.35
37964.0	52.903 1	128.1484 4	32.8702 2	-164553 3	.276801 5	11.477983 2	.44E-5 1	6.934277	120	8	3.46
37966.0	63.462 1	121.1086 5	32.8695 2	-164589 3	.232854 5	11.478004 2	.34E-5 1	6.933963	108	8	3.68
37968.0	74.015 1	114.0680 5	32.8693 2	-164611 3	.188957 5	11.478014 2	.27E-5 1	6.933782	114	8	3.64

## Satellite 1959 Alpha 1

2 November - 30 December 1962

T (MJD)	w	$\Omega$	i	e	M	n	$n^{1/2}$	q	N	D	C
37970.0	84.566 1	107.0269 5	32.8693 2	.164625 3	.145087 5	11.478023 3	.29E-5 1	6.933659	111	8	3.79
37972.0	95.120 1	99.9861 5	32.8697 2	.164612 4	.101229 6	11.478040 3	.33E-5 1	6.933761	100	8	4.04
37974.0	105.672 2	92.9408 5	32.8701 3	.164587 4	.057403 6	11.478055 3	.32E-5 1	6.933967	94	8	4.17
37976.0	116.226 2	85.9035 6	32.8709 4	.164547 6	.013602 7	11.478062 3	.32E-5 1	6.934289	74	8	4.28
37978.0	126.784 2	78.8640 7	32.8729 4	.164504 5	.969811 7	11.478074 3	.29E-5 1	6.934642	67	8	4.32
37980.0	137.345 2	71.8263 9	32.8751 4	.164439 6	.926030 8	11.478085 4	.33E-5 1	6.935179	59	8	4.40
37982.0	147.909 3	64.7893 8	32.8773 3	.164367 6	.882265 8	11.478101 4	.41E-5 1	6.935773	57	8	4.22
37984.0	158.475 3	57.7508 7	32.8786 3	.164269 5	.838528 9	11.478124 4	.50E-5 1	6.936575	56	8	3.92
37986.0	169.059 4	50.7113 1	32.8801 3	.164161 6	.79478 1	11.478144 5	.34E-5 2	6.937464	63	8	5.72
37988.0	179.637 3	43.6760 9	32.8816 2	.164076 4	.75107 1	11.478150 4	.31E-5 1	6.938170	76	8	4.70
37990.0	190.215 3	36.6385 8	32.8830 2	.164009 4	.707394 9	11.478146 4	.41E-5 1	6.938723	79	8	4.07
37992.0	200.813 3	29.6017 8	32.8843 3	.163938 3	.663689 9	11.478170 3	.38E-5 1	6.939308	90	8	4.64
37994.0	211.415 3	22.5646 9	32.8855 3	.163870 3	.620004 8	11.478180 4	.35E-5 1	6.939868	86	8	4.52
37996.0	222.016 3	15.5275 8	32.8863 3	.163810 2	.576351 9	11.478201 4	.32E-5 1	6.940351	79	8	3.92
37998.0	232.623 3	8.4904 6	32.8874 3	.163759 2	.532700 7	11.478216 3	.33E-5 1	6.940768	80	8	3.46
38000.0	243.229 4	1.4532 7	32.8885 3	.163715 2	.489008 1	11.478232 4	.30E-5 1	6.941132	86	8	3.96
38002.0	253.831 4	354.4174 5	32.8889 3	.163683 2	.44549 1	11.478245 5	.29E-5 1	6.941390	93	8	3.90
38004.0	264.440 3	347.3805 5	32.8895 3	.163664 2	.401904 9	11.478261 4	.37E-5 1	6.941540	92	8	3.74
38006.0	275.045 3	340.3448 5	32.8893 3	.163665 2	.358357 9	11.478268 4	.40E-5 1	6.941536	77	8	3.39
38008.0	285.658 3	333.3082 5	32.8887 4	.163681 2	.31482 1	11.478279 4	.39E-5 1	6.941393	66	8	3.44
38010.0	296.271 3	326.2713 6	32.8879 4	.163708 2	.271321 8	11.478295 3	.39E-5 1	6.941160	66	8	3.19
38012.0	306.882 3	319.2343 8	32.8864 4	.163754 4	.227856 8	11.478316 4	.40E-5 1	6.940772	73	8	3.38
38014.0	317.489 3	312.1974 8	32.8851 3	.163787 3	.184442 7	11.478336 4	.44E-5 1	6.940492	85	8	3.74
38016.0	328.088 3	305.1604 9	32.8837 3	.163840 3	.141084 7	11.478358 3	.513E-5 9	6.940042	96	8	4.19
38018.0	338.686 2	298.1230 9	32.8824 2	.163906 3	.097773 7	11.478375 3	.521E-5 9	6.939484	92	8	4.18
38020.0	349.276 3	291.085 1	32.8811 2	.163986 4	.054525 8	11.478393 3	.42E-5 1	6.938819	85	8	4.44
38022.0	259.865 2	284.047 1	32.8797 2	.164079 5	.011309 8	11.478404 3	.40E-5 1	6.938041	92	8	4.26
38024.0	10.447 2	277.0103 7	32.8783 2	.164175 4	.968142 6	11.478421 2	.39E-5 1	6.937232	89	8	3.78
38026.0	21.026 2	269.9721 7	32.8766 2	.164273 4	.925018 6	11.478436 3	.360E-5 9	6.936415	83	8	3.92
38028.0	31.600 2	262.9326 5	32.8749 2	.164358 5	.881939 5	11.478451 2	.290E-5 9	6.935706	85	8	3.67

T (MD)	w	Q	i	e	M	n	n'2	q	N	D	σ
37846.0	60.2028 7	137.1124 6	33.3444 2	-189185 4	.258207 1	11.0872718 5	-524E-5 6	6.887082	38	8	2.62
37848.0	69.9628 6	130.5378 5	33.3444 1	-189227 3	.432843 1	11.0872913 4	-399E-5 4	6.886716	37	8	2.29
37850.0	79.7236 5	123.9639 4	33.3448 2	-189258 2	.607500 1	11.0873087 4	-452E-5 4	6.886446	31	8	1.61
37852.0	89.4821 7	117.3901 6	33.3449 3	-189279 4	.782198 1	11.0873271 8	-49E-5 1	6.886261	40	8	2.19
37854.0	99.2429 7	110.8145 7	33.3448 2	-189286 4	.956934 1	11.0873447 5	-45E-5 1	6.886194	50	8	2.44
37856.0	109.0046 9	104.2396 9	33.3453 2	-189273 4	.131703 1	11.0873623 9	-45E-5 2	6.886297	46	8	2.59
37858.0	118.766 1	97.6666 1	33.3463 2	-189224 4	.306513 2	11.0873854 8	.46E-5 2	6.886705	46	8	2.63
37860.0	128.526 1	91.094 1	33.3475 2	-189170 5	.481357 2	11.087408 1	-.55E-5 2	6.887154	39	8	2.71
37862.0	138.291 1	84.5201 9	33.3490 2	-189105 4	.656237 2	11.0874274 7	-.64E-5 2	6.887694	34	8	2.41
37864.0	148.070 3	77.9450 6	33.3503 2	-189112 2	.831109 2	11.087444 4	.709E-5 9	6.887608	31	8	1.40
37866.0	157.835 2	71.3720 8	33.3516 2	-18997 1	.006117 9	11.087480 5	.77E-5 1	6.888791	40	8	2.04
37868.0	167.619 3	64.798 1	33.3529 4	-18993 2	.18111 2	11.087503 5	.71E-5 2	6.889165	37	8	2.19
37870.0	177.404 3	58.2228 6	33.3551 2	-18884 2	.35617 1	11.087514 7	.702E-5 8	6.889956	28	8	.98
37872.0	187.196 2	51.6480 7	33.3573 3	-18875 2	.53126 1	11.087554 4	.657E-5 7	6.890643	26	8	1.07
37874.0	196.995 5	45.071 3	33.361 1	-1886 1	.706E+0 4	11.08760 2	.57E-5 1	6.891639	24	8	1.80
37876.0	206.789 4	38.500 2	33.361 1	-18841 7	.88162 3	11.087585 8	.40E-5 2	6.893520	32	8	3.19
37878.0	216.592 2	31.9276 6	33.3624 6	-188500 9	.056752 4	11.087620 2	.27E-5 2	6.892759	45	8	3.53
37880.0	226.393 1	25.3549 5	33.3636 5	-188451 4	.231962 3	11.087635 2	.23E-5 2	6.893170	52	8	3.97
37882.0	236.192 1	18.7818 6	33.3646 6	-188419 4	.407193 3	11.087645 2	.18E-5 2	6.893439	48	8	3.86
37884.0	245.992 2	12.2092 8	33.3655 7	-188396 9	.582438 5	11.087657 2	.25E-5 2	6.893631	43	8	4.01
37886.0	255.801 2	5.636 1	33.365 1	-188382 7	.751675 6	11.087652 2	.20E-5 3	6.893751	37	8	4.08
37888.0	265.605 2	359.064 2	33.365 1	-18836 2	.93296 1	11.087649 6	.54E-6 26	6.893981	26	8	2.66
37890.0	275.4173 9	352.4904 8	33.3639 3	-188377 4	.108284 2	11.087678 2	-.25E-5 2	6.893780	27	8	1.91
37892.0	285.222 1	345.9170 8	33.3638 2	-188366 3	.283506 3	11.087690 1	.32E-5 1	6.893866	28	8	1.70
37894.0	295.025 2	339.344 1	33.3635 2	-188372 4	.458837 5	11.087704 2	.34E-5 1	6.893815	24	8	2.01
37896.0	304.826 3	332.775 2	33.3630 4	-188395 6	.634199 7	11.087714 2	.24E-5 1	6.893616	30	8	4.86
37898.0	314.633 2	326.203 1	33.3627 2	-188425 4	.809565 5	11.087723 2	.264E-5 8	6.893350	38	8	2.88
37900.0	324.428 1	319.632 4	33.3618 2	-188483 2	.984987 2	11.087725 1	.344E-5 9	6.892857	55	8	2.88
37902.0	334.230 2	313.0602 9	33.3607 2	-188550 2	.160416 3	11.087739 2	.35E-5 1	6.892288	60	8	2.88
37904.0	344.030 1	306.4868 7	33.3593 1	-188613 2	.335880 3	11.087749 1	.304E-5 6	6.891742	68	8	2.38
37906.0	353.826 3	299.913 1	33.3578 2	-188681 4	.511380 5	11.087764 2	.34E-5 1	6.891158	58	8	2.59

T (MTD)	$\omega$	$\Omega$	i	e	M	n	$n^{1/2}$	q	N	D	$\sigma$
37970.0	306.972 2	89.5285 9	33.3607 5	.188353 5	.146144 5	11.088273 2	.25E-5 1	6.893737	60	8	4.41
37972.0	316.776 2	82.9539 8	33.3607 3	.188388 2	.322647 4	11.088285 2	.30E-5 1	6.893435	53	8	3.77
37974.0	326.571 2	76.382 1	33.3603 3	.188440 3	.499191 5	11.088300 3	.34E-5 1	6.892989	50	8	4.21
37976.0	336.377 3	69.807 1	33.3601 3	.188497 2	.675737 6	11.088306 2	.38E-5 1	6.892503	46	8	3.52
37978.0	346.174 3	63.237 2	33.3602 3	.188571 2	.852327 7	11.088312 3	.32E-5 1	6.891869	34	8	3.89
37980.0	355.970 4	56.668 1	33.3594 3	.188642 2	.028946 7	11.088317 4	.37E-5 1	6.891267	30	8	3.52
37982.0	5.760 2	50.0962 9	33.3590 2	.188715 2	.205616 5	11.088339 2	.42E-5 1	6.890637	31	8	2.76
37984.0	15.547 2	43.522 1	33.3578 3	.188787 2	.382333 5	11.088362 3	.38E-5 1	6.890013	36	8	3.23
37986.0	25.330 3	36.947 1	33.3569 4	.188861 2	.559097 6	11.088377 3	.22E-5 1	6.889376	39	8	3.87
37988.0	35.108 2	30.3710 9	33.3562 3	.188934 1	.735890 4	11.088383 2	.70E-6 9	6.888755	31	8	2.01
37990.0	44.878 3	23.797 1	33.3547 4	.189000 3	.912705 6	11.088388 2	.95E-6 1	6.888189	27	8	2.71
37992.0	54.651 5	17.223 2	33.3542 7	.189049 6	.08952 1	11.088388 5	.23E-5 2	6.887780	18	8	2.98
37994.0	64.449 4	10.647 4	33.3553 2	.1889 1	.26628 5	11.08837 2	.15E-5 3	6.889327	12	8	4.53
37996.0	74.167 7	4.069 4	33.3553 1	.18917 2	.44327 2	11.08839 2	-.13E-5 3	6.886732	13	8	2.98
37998.0	83.937 3	357.4928 9	33.3531 6	.189171 4	.620123 8	11.088388 3	.11E-5 1	6.886736	18	8	2.24
38000.0	93.708 2	350.9191 6	33.3546 7	.189166 3	.796970 6	11.088406 3	.16E-5 1	6.886778	22	8	3.05
38002.0	103.469 2	344.3442 4	33.3535 6	.189138 3	.973859 5	11.088428 3	.22E-5 2	6.887001	23	8	2.47
38004.0	113.225 2	337.7694 5	33.3552 7	.189094 3	.150778 4	11.088436 2	.28E-5 1	6.887378	22	8	1.93
38006.0	122.993 3	331.191 1	33.3552 2	.189062 9	.327701 7	11.088428 6	.21E-5 2	6.887653	22	8	1.91
38008.0	132.756 9	324.614 4	33.3552 3	.188889 9	.50460 2	11.088436 8	.40E-5 3	6.8889153	22	8	4.38
38010.0	142.549 7	318.040 4	33.3553 3	.18879 9	.68147 3	11.088438 9	.46E-5 3	6.889941	28	8	4.26
38012.0	152.327 7	311.466 3	33.3555 2	.188883 8	.85848 3	11.08847 1	.36E-5 2	6.889566	34	8	4.66
38014.0	162.111 5	304.893 3	33.3557 1	.188887 1	.035482 8	11.088481 5	.24E-5 3	6.889266	44	8	4.51
38016.0	171.894 3	298.321 2	33.3583 6	.188771 5	.212471 5	11.088494 2	.12E-5 2	6.890093	53	8	4.29
38018.0	181.679 3	291.747 2	33.3595 5	.188687 4	.389471 4	11.088496 3	.8E-7 18	6.890809	51	8	4.68
38020.0	191.479 2	285.169 1	33.3603 3	.188629 4	.566439 4	11.088490 2	-.17E-5 1	6.891303	53	8	3.90
38022.0	201.271 2	278.5969 9	33.3616 2	.188573 3	.743404 4	11.088482 1	-.215E-5 8	6.891784	50	8	2.86
38024.0	211.068 3	272.022 2	33.3619 2	.188514 4	.920340 5	11.088484 3	-.18E-5 1	6.892280	47	8	3.34
38026.0	220.861 2	265.450 1	33.3628 2	.188459 3	.097267 4	11.088481 2	-.11E-5 1	6.892754	49	8	3.28
38028.0	230.660 2	258.879 1	33.3623 3	.188405 3	.274165 4	11.088469 1	-.61E-6 12	6.893211	47	8	3.75

## Satellite 1960 Iota 2

1 July - 30 August 1962

$\frac{T}{(MJD)}$	$\omega$	$\Omega$	$i$	$e$	$M$	$n$	$n'/2$	$q$	$N$	$D$	$\sigma$
37846.0	254.8572	6	284.0856	5	.47.2322	2	.010808	5	.91475	2	7.885366
37848.0	261.157	8	277.8840	5	.47.2323	2	.010801	6	.30791	2	12.19701
37850.0	267.458	7	271.6822	4	.47.2319	2	.010798	4	.70107	2	12.19705
37852.0	273.806	8	265.4807	4	.47.2317	2	.010795	4	.09412	2	12.196972
37854.0	280.161		259.2795	5	.47.2313	2	.010792	6	.48719	3	12.19701
37856.0	286.447	9	253.0769	3	.47.2311	2	.010811	5	.88040	3	12.19706
37858.0	292.697	9	246.8742	3	.47.2307	2	.010824	5	.27373	3	12.19712
37860.0	298.991		240.6714	4	.47.2301	3	.010868	6	.66694	4	12.19703
37862.0	305.251		234.4681	4	.47.2292	3	.010900	6	.06024	4	12.19704
37864.0	311.482		228.2646	5	.47.2286	3	.010938	6	.45362	4	12.19703
37866.0	317.692		222.0621	5	.47.2287	3	.010991	6	.84706	5	12.19708
37868.0	323.832		215.8597	4	.47.2293	3	.011047	6	.24072	5	12.19710
37870.0	330.012		209.6576	4	.47.2294	3	.011120	5	.63426	5	12.19710
37872.0	336.132		203.4553	3	.47.2289	2	.011180	3	.02795	5	12.19717
37874.0	342.212		197.2529	3	.47.2288	2	.011245	3	.42177	5	12.19706
37876.0	348.292		191.0497	3	.47.2290	2	.011309	3	.81558	5	12.19704
37878.0	354.332		184.8468	3	.47.2292	2	.011377	3	.20948	6	12.19704
37880.0	.332		178.6442	3	.47.2296	2	.011445	2	.60350	6	12.19710
37882.0	6.292		172.4418	3	.47.2298	2	.011518	2	.99765	6	12.19711
37884.0	12.202		166.2394	3	.47.2299	2	.011589	2	.40038	5	12.19713
37886.0	18.082		160.0371	4	.47.2300	2	.011659	2	.78628	5	12.19712
37888.0	23.942		153.8346	4	.47.2302	1	.011727	2	.18070	5	12.19709
37890.0	29.732		147.6335	4	.47.2303	2	.011788	2	.57529	5	12.19708
37892.0	35.562		141.4312	4	.47.2310	2	.011850	2	.96976	5	12.19704
37894.0	41.322		135.2288	4	.47.2309	2	.011901	2	.36443	5	12.19703
37896.0	47.042		129.0267	6	.47.2308	3	.011958	3	.75919	7	12.19703
37898.0	52.772		122.8238	5	.47.2310	3	.012009	3	.15395	6	12.19703
37900.0	58.432		116.6216	4	.47.2302	3	.012039	3	.54891	6	12.19712
37902.0	64.103		110.4195	4	.47.2302	4	.012074	3	.94381	7	12.19705
37904.0	69.783		104.2162	4	.47.2307	4	.012103	3	.33868	7	12.19702
37906.0	75.472		98.0126	3	.47.2310	4	.012124	2	.73353	6	12.19698

 $\frac{\Phi}{}$

T (MJD)	Ω	i	e	M	n	n'/2	q	N	D	σ
37908.0	81.19 2	91.8094 3	47.2317 3	.012145 2	.12828 6	12.19700 2	-.57E-6 8	7.814725	97	8 3.75
37910.0	86.84 2	85.6059 3	47.2317 2	.012156 2	.52325 5	12.19708 2	.27E-6 8	7.814602	102	8 3.66
37912.0	92.44 2	79.4031 3	47.2316 2	.012159 2	.91836 5	12.19712 2	-.50E-6 7	7.814564	110	8 3.75
37914.0	98.03 2	73.-2008 2	47.2316 2	.012156 1	.31347 6	12.19709 2	-.144E-5 9	7.814602	94	8 3.55
37916.0	103.69 2	66.9980 3	47.2312 2	.011144 2	.70840 6	12.19699 3	-.117E-5 8	7.814741	83	8 3.87
37918.0	109.-37 3	60.-7949 5	47.2308 3	.011124 2	.10030 8	12.19697 4	-.63E-6 11	7.814913	68	8 3.80
37920.0	115.04 3	54.-5893 4	47.2298 4	.011094 2	.49812 9	12.19704 3	-.15E-6 9	7.815116	46	8 3.61
37922.0	120.74 4	48.3856 5	47.2299 5	.011054 2	.8929 1	12.19703 3	*3E-8 99	7.815436	65	8 4.39
37924.0	126.-37 3	42.-1809 4	47.2317 3	.011016 2	.28794 8	12.19694 2	-.25E-6 7	7.815779	54	8 2.50
37926.0	132.14 3	35.9798 4	47.2321 4	.011971 2	.68254 7	12.19699 2	-.78E-6 1	7.816116	77	8 3.30
37928.0	137.89 2	29.-7779 5	47.2326 3	.011923 2	.07718 7	12.19699 2	-.102E-5 8	7.816503	80	8 3.26
37930.0	143.68 2	23.-5757 5	47.2330 3	.011867 2	.47174 7	12.19707 2	-.14E-5 1	7.817912	67	8 3.07
37932.0	149.44 3	17.-3756 5	47.2339 2	.011808 2	.86637 7	12.19708 2	-.132E-5 8	7.817380	79	8 3.75
37934.0	155.21 2	11.-1744 6	47.2345 2	.011748 2	.26095 7	12.19704 2	-.50E-6 8	7.817785	84	8 3.51
37936.0	161.04 2	4.9731 6	47.2348 2	.011686 2	.65537 6	12.19699 2	*33E-6 9	7.818391	88	8 3.41
37938.0	166.90 2	358.-7720 5	47.2349 2	.011622 2	.04970 6	12.19697 2	.28E-6 9	7.818909	82	8 3.21
37940.0	172.79 3	352.-5698 5	47.2345 2	.011559 2	.44397 8	12.19704 2	-.31E-6 9	7.8179380	77	8 3.51
37942.0	178.65 4	346.-3693 7	47.2333 4	.011491 3	.8383 1	12.19704 3	-.12E-5 1	7.8179920	59	8 4.39
37944.0	184.61 4	340.-1669 7	47.2332 5	.011424 3	.2324 1	12.19706 3	-.13E-5 1	7.880451	53	8 4.09
37946.0	190.62 4	333.-9640 7	47.2330 5	.011355 4	.6263 1	12.19708 3	-.11E-5 2	7.880991	49	8 4.13
37948.0	196.67 3	327.-7601 6	47.2332 5	.011286 3	.02014 9	12.19702 2	-.3E-7 10	7.881569	45	8 3.18
37950.0	202.89 5	321.-5571 8	47.2340 6	.011206 6	.4135 1	12.19702 2	*55E-6 10	7.8822207	59	8 4.51
37952.0	208.98 4	315.-3528 6	47.2340 4	.011138 5	.8072 1	12.19706 2	.62E-7 78	7.882731	58	8 3.05
37954.0	215.09 3	309.-1507 3	47.2338 3	.011083 4	.20085 8	12.19705 1	-.33E-6 7	7.883172	82	8 3.41
37956.0	221.23 2	302.-9490 2	47.2335 2	.011033 3	.59445 6	12.19701 1	-.67E-6 8	7.883585	121	8 3.58
37958.0	227.44 2	296.-7474 2	47.2332 2	.010987 3	.98784 5	12.19700 1	-.85E-6 7	7.883960	155	8 3.90
37960.0	233.71 2	290.-5456 2	47.2330 2	.010942 3	.38105 5	12.19697 1	-.39E-6 7	7.884331	183	8 4.43
37962.0	240.00 2	284.-3433 2	47.2328 2	.010904 3	.77423 5	12.19700 9	-.30E-7 6	7.884623	163	8 4.41
37964.0	246.29 2	278.-1403 3	47.2325 3	.010868 4	.16737 5	12.19703 1	*14E-6 7	7.884897	162	8 4.31
37966.0	252.59 2	271.-9371 4	47.2323 3	.010838 4	.56053 5	12.19704 1	.54E-6 8	7.885134	132	8 4.05
37968.0	258.94 2	265.-7352 3	47.2320 3	.010803 4	.95352 4	12.19698 7	.65E-6 6	7.885428	100	8 2.80

## Satellite 1960 Iota 2

2 November - 30 December 1962

T (MD)	$\omega$	$\Omega$	1	e	M	n	$n'/2$	q	N	D	$\sigma$							
37970.0	265.21	2	259.5320	4	.47.2321	3	.010806	4	.34677	5	12.196965	7	.10E-6	7	7.885418	101	8	3.08
37972.0	271.53	2	253.3292	4	.47.2318	3	.010806	4	.73986	5	12.19696	1	-.28E-7	79	7.885417	84	8	3.17
37974.0	277.87	2	247.1269	4	.47.2315	3	.010811	3	.13292	4	12.19698	1	-.23E-6	8	7.885375	82	8	3.23
37976.0	284.17	2	240.9240	4	.47.2315	3	.010829	4	.52606	5	12.19695	1	-.11E-6	8	7.885241	76	8	3.24
37978.0	290.52	2	234.7219	5	.47.2318	3	.010846	4	.91908	6	12.19691	2	.29E-6	12	7.885121	52	8	3.18
37980.0	296.85	2	228.5193	5	.47.2311	3	.010854	5	.31213	6	12.19699	1	.151E-5	9	7.885025	67	8	3.63
37982.0	303.15	2	222.3169	5	.47.2306	2	.010884	5	.70530	6	12.19703	1	.169E-5	9	7.884772	69	8	3.82
37984.0	309.38	3	216.1158	6	.47.2305	3	.010929	6	.10378	8	12.19702	2	.98E-6	13	7.884416	87	8	5.05
37986.0	315.62	3	209.9139	6	.47.2305	3	.010972	6	.49202	9	12.19699	3	-.1E-7	24	7.884082	77	8	4.62
37988.0	321.78	3	203.7125	5	.47.2302	3	.011029	5	.88556	8	12.19700	2	-.22E-6	13	7.883627	85	8	4.59
37990.0	327.98	2	197.5101	4	.47.2300	2	.011075	3	.27900	6	12.19707	1	.60E-6	8	7.883231	87	8	3.60
37992.0	334.14	2	191.3078	3	.47.2298	2	.011130	3	.67257	5	12.19709	2	.19E-5	1	7.882781	96	8	3.48
37994.0	340.22	1	185.1048	2	.47.2295	2	.011206	2	.06635	3	12.197049	8	.180E-5	5	7.882190	118	8	2.97
37996.0	346.292	9	178.9018	2	.47.2290	2	.011271	2	.46018	3	12.19703	1	.201E-5	7	7.881681	103	8	2.76
37998.0	352.31	1	172.6987	3	.47.2287	2	.011341	3	.85417	3	12.19708	1	.124E-5	6	7.881100	96	8	3.11
38000.0	358.296	9	166.4962	3	.47.2287	2	.011398	4	.24823	3	12.19715	1	-.81E-7	6	7.880617	92	8	3.01
38002.0	4.228	9	160.2932	3	.47.2286	2	.011460	4	.64245	3	12.19714	1	-.22E-6	6	7.880125	86	8	3.10
38004.0	10.085	9	154.0905	3	.47.2281	2	.011531	4	.03686	3	12.19713	1	.37E-6	8	7.879568	99	8	3.23
38006.0	15.97	1	147.8874	3	.47.2280	2	.011585	3	.43120	3	12.19714	1	.122E-5	7	7.879134	101	8	3.70
38010.0	27.62	1	135.4809	3	.47.2295	2	.011711	3	.22022	4	12.19711	1	.116E-5	8	7.878138	133	8	4.66
38012.0	33.42	1	129.2781	3	.47.2306	2	.011771	4	.61481	4	12.19714	2	.50E-6	8	7.877650	131	8	4.26
38014.0	39.18	1	123.0754	3	.47.2307	2	.011825	3	.00950	3	12.19710	1	.16E-6	7	7.877234	140	8	3.94
38016.0	44.90	1	116.8732	3	.47.2308	2	.011875	3	.41066	4	12.19710	2	-.63E-7	76	7.876835	129	8	3.95
38018.0	50.61	1	110.6704	4	.47.2310	2	.011915	3	.79913	4	12.19707	2	-.72E-6	7	7.876529	104	8	3.73
38020.0	56.32	2	104.4683	5	.47.2310	2	.011961	4	.19395	4	12.19707	2	-.20E-6	8	7.876167	88	8	3.73
38022.0	61.99	2	98.2668	6	.47.2316	2	.011993	4	.58887	5	12.19706	2	.33E-6	1	7.875914	65	8	3.54
38024.0	67.63	2	92.0650	6	.47.2322	3	.012023	4	.98387	5	12.19703	2	.44E-6	8	7.875687	58	8	3.19
38026.0	73.30	2	85.8656	8	.47.2314	4	.012057	6	.37880	7	12.19710	2	.2E-7	13	7.875389	56	8	3.68
38028.0	78.95	2	79.6630	7	.47.2314	4	.012080	6	.77377	6	12.19708	2	-.19E-6	1	7.875213	51	8	3.56

T (MJD)	w	Ω	1	e	M	n	n/2	q	N D σ									
37846.0	328.007	3	156.3879	5	38.8299	2	.106714	2	.95716 1	12.206107	7	.344E-4	6	7.116766	79	4	3.76	
37848.0	337.645	3	149.0896	4	38.8308	2	.106784	2	.36947 1	12.20623	1	.371E-4	5	7.116158	72	4	3.66	
37850.0	347.271	4	141.7917	4	38.8318	2	.106860	2	.78211 1	12.20640	1	.454E-4	4	7.115487	73	4	3.07	
37852.0	356.897	2	134.4944	3	38.8313	2	.106946	2	.195108	8	12.206586	7	.468E-4	3	7.114732	93	4	2.99
37854.0	6.520	2	127.1967	3	38.8301	1	.107043	1	.608484	7	12.206790	6	.494E-4	3	7.113880	99	4	3.07
37856.0	16.131	2	119.8979	2	38.8292	1	.107148	1	.022291	6	12.206992	6	.478E-4	3	7.112965	62	4	1.92
37858.0	25.733	3	112.5994	4	38.8286	2	.107265	2	.436510	9	12.207200	9	.552E-4	4	7.111951	77	4	3.47
37860.0	35.329	3	105.3004	5	38.8281	2	.107389	2	.851191	9	12.207422	7	.579E-4	4	7.110875	88	4	4.15
37862.0	44.926	4	98.0014	6	38.8279	3	.107524	3	.26633 1	12.207645	9	.585E-4	5	7.109718	72	4	4.29	
37864.0	54.510	3	90.7007	7	38.8271	3	.107644	3	.68198 1	12.20791	1	.635E-4	5	7.108659	66	4	4.26	
37866.0	64.096	3	83.3986	7	38.8267	3	.107774	3	.098138	9	12.208156	7	.676E-4	5	7.107528	65	4	3.75
37868.0	73.664	4	76.0946	8	38.8268	3	.107871	4	.51491 1	12.208470	8	.675E-4	6	7.106633	62	4	3.80	
37870.0	83.233	3	68.7925	7	38.8269	3	.107964	4	.93223 1	12.208750	8	.754E-4	5	7.105783	61	4	3.63	
37872.0	92.792	3	61.4896	4	38.8273	3	.108050	4	.350164	9	12.209073	7	.768E-4	4	7.104975	50	4	2.82
37874.0	102.358	3	54.1859	3	38.8278	3	.108127	4	.768698	7	12.209356	6	.678E-4	4	7.104245	50	4	2.61
37876.0	111.925	2	46.8814	3	38.8280	3	.108190	3	.187778	6	12.209602	6	.664E-4	3	7.103653	73	4	3.27
37878.0	121.505	2	39.5756	3	38.8289	3	.108240	3	.607361	6	12.209883	5	.744E-4	3	7.103145	83	4	3.44
37880.0	131.085	2	32.2700	3	38.8300	3	.108265	3	.027537	6	12.210176	6	.719E-4	4	7.102834	91	4	3.98
37882.0	140.677	2	24.9637	4	38.8304	3	.108279	3	.448255	7	12.210447	5	.713E-4	4	7.102613	84	4	3.77
37884.0	150.264	3	17.6565	5	38.8315	4	.108269	4	.869573	9	12.210767	7	.777E-4	5	7.102574	88	4	4.74
37886.0	159.865	3	10.3488	7	38.8316	4	.108278	5	.29147 1	12.211087	8	.787E-4	4	7.102375	93	4	5.00	
37888.0	169.475	3	3.0414	7	38.8319	4	.108287	5	.71398 1	12.211394	8	.767E-4	6	7.102186	76	4	4.54	
37890.0	179.088	4	355.734	1	38.8336	5	.108307	6	.13710 1	12.211715	7	.889E-4	6	7.101896	52	4	4.46	
37892.0	188.706	3	348.4248	7	38.8353	3	.108332	4	.560907	7	12.212086	6	.1062E-3	4	7.101559	66	4	3.27
37894.0	198.350	2	341.1148	6	38.8357	3	.108373	4	.985477	7	12.212523	5	.1105E-3	4	7.101063	81	4	3.84
37896.0	207.989	1	333.8032	4	38.8360	1	.108420	2	.410948	4	12.212972	3	.1040E-3	2	7.100511	53	4	2.03
37898.0	217.633	3	326.4905	7	38.8363	2	.108476	4	.837237	7	12.213376	6	.1070E-3	5	7.099911	56	4	3.35
37900.0	227.274	2	319.1791	6	38.8371	2	.108528	4	.264385	6	12.213835	5	.1097E-3	3	7.099318	80	4	3.35
37902.0	236.915	1	311.8657	3	38.8377	1	.108612	3	.692412	4	12.214269	4	.1023E-3	3	7.098482	81	4	2.65
37904.0	246.558	2	304.5509	4	38.8383	1	.108708	3	.121260	5	12.214674	3	.968E-4	3	7.097559	74	4	2.64
37906.0	256.204	2	297.2344	6	38.8389	2	.108815	4	.550882	5	12.215071	5	.1027E-3	3	7.096553	88	4	3.04

## Satellite 1961 Delta 1

2 September - 31 October, 1962

T (MD)	$\omega$	$\Omega$	1	e	M	n	$n'/2$	q	N	D	o	
37908.0	265.855	2	289.9173	8	38.8397	2	-108938	5	.981306	7	12.215900	6
37910.0	275.502	2	282.5993	8	38.8405	2	-109061	5	.412605	5	12.215963	5
37912.0	285.144	3	275.2801	6	38.8416	4	-109190	7	.844882	1	12.216395	8
37914.0	294.796	3	267.9608	4	38.8425	3	-109324	6	.277884	1	12.216768	8
37916.0	304.452	3	260.6415	3	38.8427	2	-109460	5	.711661	9	12.217159	8
37918.0	314.108	3	253.3208	3	38.8425	2	-109609	6	.14628	1	12.217547	9
37920.0	323.757	4	245.9989	5	38.8422	2	-109760	6	.58173	1	12.218001	8
37922.0	333.408	3	238.6777	6	38.8428	3	-109914	5	.018121	9	12.218499	9
37924.0	343.067	4	231.3542	7	38.8424	3	-110078	6	.45543	1	12.218912	8
37926.0	352.717	3	224.0298	6	38.8410	3	-110203	4	.893693	8	12.219381	6
37928.0	2.349	3	216.7055	8	38.8409	3	-110015	5	.332951	9	12.219882	7
37930.0	11.981	2	209.3797	5	38.8403	3	-110609	4	.773205	6	12.220362	4
37932.0	21.611	2	202.0514	5	38.8386	3	-110814	4	.214485	6	12.220880	5
37934.0	31.232	1	194.7219	3	38.8376	1	-111025	3	.656832	4	12.221432	3
37936.0	40.841	3	187.3918	9	38.8373	3	-111238	7	.100335	9	12.221989	7
37938.0	50.445	1	180.0597	4	38.8374	1	-111427	3	.545066	3	12.222654	3
37940.0	60.040	3	172.724	1	38.8367	4	-111613	8	.991174	8	12.223340	7
37942.0	69.622	1	165.3888	4	38.8365	2	-111790	3	.438575	3	12.223936	3
37944.0	79.200	1	158.0515	4	38.8372	2	-111960	4	.887148	3	12.224525	3
37946.0	88.773	2	150.7147	7	38.8380	3	-112123	6	.336949	6	12.225180	6
37948.0	98.342	3	143.376	2	38.8388	5	-112223	2	.78809	1	12.225830	9
37950.0	107.920	2	136.038	2	38.8409	3	-11240	1	.24045	1	12.226465	8
37952.0	117.482	3	128.6916	7	38.8415	3	-11246	1	.69413	1	12.227089	8
37954.0	127.074	3	121.3464	6	38.8437	2	-112554	9	.14894	1	12.227654	9
37956.0	136.666	3	114.0027	6	38.8461	2	-112585	6	.60486	1	12.22817	1
37958.0	146.274	3	106.6572	7	38.8484	3	-112604	6	.06179	1	12.22865	1
37960.0	155.905	3	99.3114	6	38.8500	3	-112610	5	.519647	9	12.229148	7
37962.0	165.543	4	91.9637	7	38.8512	4	-112612	6	.97857	1	12.22975	1
37964.0	175.168	3	84.6158	5	38.8528	3	-112607	5	.43876	1	12.230413	7
37966.0	184.850	4	77.2693	5	38.8542	4	-112602	6	.90031	1	12.231123	9
37968.0	194.509	3	69.9231	4	38.8561	2	-112606	4	.363130	8	12.231695	5

T (MJD)	w	v	z	Ω	1	e	M	n	n <sup>1/2</sup>	q	N	D	σ
37970.0	204.191 2	62.5761 4	38.8568 2	-112628 4	.827097 7	12.232321 7	*1491E-3 3	7.059546	87 4	3.13			
37972.0	213.877 2	55.2266 4	38.8568 1	.112654 3	.292259 5	12.232926 4	*1552E-3 3	7.059107	91 4	2.98			
37974.0	223.569 2	47.8749 5	38.8565 1	-112701 4	.758653 6	12.233558 5	*1599E-3 3	7.058487	72 4	2.45			
37976.0	233.265 3	40.5220 6	38.8570 2	-112764 7	.226632 1	12.234208 9	*1629E-3 5	7.057739	47 4	2.35			
37978.0	242.952 3	33.1683 5	38.8571 2	-112830 6	.695316 9	12.234833 6	*1517E-3 3	7.056972	57 4	2.96			
37980.0	252.659 2	25.8163 6	38.8577 2	-112967 5	.165467 7	12.235449 5	*1557E-3 2	7.055643	67 4	2.24			
37982.0	262.355 3	18.456 2	38.8580 3	-11309 1	.63691 1	12.23610 1	*1575E-3 5	7.054446	54 4	2.93			
37984.0	272.057 8	11.096 4	38.8581 8	.11320 2	.10962 3	12.23683 3	*193E-3 2	7.053258	36 4	6.09			
37986.0	281.741 4	3.738 2	38.8578 7	.113375 9	.58391 1	12.23751 1	*1641E-3 6	7.051610	39 4	3.23			
291.446 6	356.380 2	38.8572 8	.11351 1	.05949 1	12.238181 8	*1575E-3 6	7.050295	49 4	3.97				
37988.0	301.130 9	349.977 3	38.855 2	.11365 2	.53639 2	12.23886 2	*1831E-3 8	7.048935	41 4	4.72			
37990.0	310.828 3	341.6516 6	38.8598 5	.11387 1	.01475 1	12.23956 1	*1804E-3 8	7.046917	42 4	3.78			
37992.0	320.526 4	334.2868 6	38.8600 7	.11406 1	.49452 1	12.240252 8	*1629E-3 8	7.045102	55 4	5.73			
37994.0	330.217 2	326.9212 4	38.8597 4	-114289 5	.975597 5	12.240890 4	*1544E-3 5	7.043041	72 4	3.79			
37996.0	339.899 2	319.5541 6	38.8582 6	.114534 6	.457939 6	12.241522 5	*1644E-3 6	7.040852	62 4	5.02			
37998.0	349.591 2	312.8151 6	38.8569 6	.114766 6	.941584 5	12.242195 6	*1644E-3 5	7.038742	54 4	4.12			
38000.0	359.267 2	304.8139 8	38.8563 5	.115007 7	.426631 6	12.242883 6	*1723E-3 5	7.036562	53 4	4.69			
38002.0	8.930 2	297.4413 7	38.8551 4	.115251 6	.913150 4	12.243631 3	*1908E-3 4	7.034338	52 4	3.77			
38004.0	18.590 1	290.0648 6	38.8533 2	.115494 4	.401188 3	12.244377 2	*1799E-3 3	7.032122	60 4	3.02			
38006.0	28.235 1	262.6862 6	38.8523 2	.115750 4	.890708 2	12.245105 2	*1853E-3 2	7.029808	50 4	2.71			
38008.0	37.874 2	275.307 1	38.8517 4	.11599 1	.381736 6	12.245890 4	*2046E-3 5	7.027611	39 4	5.68			
38010.0	47.504 2	267.9263 9	38.8511 3	.116243 8	.874401 4	12.246682 3	*1890E-3 4	7.025284	37 4	4.29			
38012.0	57.128 1	260.5435 6	38.8505 3	.116469 7	.368607 3	12.247405 2	*1727E-3 4	7.023210	46 4	3.91			
38014.0	66.742 2	253.158 1	38.8509 4	.116683 9	.864246 5	12.248151 4	*1970E-3 7	7.021094	60 4	6.76			
38016.0	76.350 1	245.7703 7	38.8515 3	.116891 7	.361462 3	12.248947 3	*1829E-3 7	7.019270	63 4	5.40			
38018.0	85.950 2	238.3819 7	38.8528 3	.117050 7	.860237 3	12.249642 3	*1650E-3 5	7.017734	51 4	5.62			
38020.0	95.5556 8	230.9919 4	38.8542 2	.117215 4	.360300 2	12.250258 2	*1357E-3 4	7.016188	41 4	2.94			
38022.0	105.147 2	223.601 1	38.8549 5	.117359 9	.861500 5	12.250787 4	*1229E-3 8	7.014841	57 4	6.99			
38024.0	114.738 2	216.214 1	38.8568 5	.11750 1	.363655 6	12.251226 5	*820E-4 9	7.013251	48 4	6.06			
38026.0	124.366 1	208.8132 7	38.8563 3	.117560 6	.866402 4	12.251430 3	*578E-4 6	7.012997	37 4	3.54			

T (MJD)	w	$\Omega$	i	e	M	n	$n^{1/2}$	q	N	D	$\sigma$
37864.0	28.72 4	243.6547 2	66.8145 2	.000073 5	.9965 1	13.8701009 2	-.29E-6 6	7.259069	59 16	3.42	
37866.0	27.32 2	238.8047 2	66.8146 2	.000066 3	.69679 6	13.8701001 3	-.14E-6 3	7.259116	63 16	3.38	
37868.0	25.96 2	233.9549 2	66.8144 2	.000065 3	.43692 7	13.8700998 2	-.8E-8 47	7.259129	61 16	3.43	
37870.0	24.60 2	229.1049 2	66.8144 2	.000061 3	.17709 7	13.8701001 3	-.18E-6 4	7.259157	61 16	3.64	
37872.0	23.23 2	224.2549 3	66.8143 3	.000061 4	.91726 6	13.8701010 4	.29E-6 6	7.259155	53 16	3.46	
37874.0	21.81 3	219.4049 3	66.8148 4	.000056 4	.65758 7	13.8701038 5	.15E-6 3	7.259197	60 16	4.12	
37876.0	20.45 3	214.5555 3	66.8142 4	.000059 4	.39774 7	13.8701047 4	.15E-6 4	7.259173	52 16	4.11	
37878.0	19.12 3	209.7058 3	66.8140 5	.000054 4	.13783 9	13.8701062 4	-.11E-6 5	7.259207	53 16	4.80	
37880.0	17.80 5	204.8556 6	66.8138 5	.000048 7	.8779 2	13.8700990 7	-.80E-7 59	7.259253	61 16	6.03	
37882.0	16.44 5	200.0062 4	66.8137 5	.000042 5	.6180 1	13.8701006 6	.80E-6 5	7.259294	61 16	5.84	
37884.0	15.07 5	195.1563 4	66.8137 5	.000041 4	.3582 1	13.8701047 6	.19E-5 1	7.259306	59 16	5.75	
37886.0	13.80 6	190.3066 5	66.8137 5	.000038 4	.0981 2	13.8701161 6	.91E-6 6	7.259319	60 16	6.07	
37888.0	12.41 7	185.4573 7	66.8138 6	.000027 6	.8384 2	13.8701170 7	.43E-6 5	7.259403	62 16	7.25	
37890.0	11.03 8	180.6068 1	66.8138 7	.00003 1	.5786 2	13.870117 1	-.17E-6 11	7.259412	52 16	7.74	
37892.0	9.60 5	175.762 1	66.8139 4	.00007 1	.3237 1	13.8701084 9	.50E-6 5	7.259061	46 16	4.61	
37894.0											

T  
(MJD)      w      Ω      i      e      M      n      n'/2      q      N      D      σ

<b>37908.0</b>											
37910.0	356.0	5	132.119 2	66.809 2	.00786 6	.985 2	13.870127 1	.45E-6 6	7.260618	45 16	6.40
37912.0	354.9	5	127.268 2	66.810 2	.00790 4	.724 1	13.8701290 9	.17E-6 5	7.260334	45 16	6.45
37914.0	353.8	5	122.417 2	66.810 2	.00793 4	.464 1	13.8701287 8	-.72E-7 83	7.260135	42 16	7.00
37916.0	352.4	2	117.5649 8	66.814 1	-.00794 1	.2040 6	13.8701274 7	.18E-6 7	7.260062	46 16	7.11
37918.0	351.67	7	112.7144 5	66.815 1	-.007958 7	.9423 2	13.8701300 5	.55E-6 5	7.259903	52 16	7.00
37920.0	350.12	6	107.8648 9	66.813 1	-.007945 8	.6831 2	13.8701334 6	.69E-6 7	7.259999	54 16	8.56
37922.0	348.71	4	103.0143 4	66.8130 8	-.007946 7	.4235 1	13.8701396 6	.49E-6 6	7.259985	53 16	7.16
37924.0	347.36	4	98.1638 4	66.8129 6	-.007933 6	.1637 1	13.8701420 6	.27E-6 6	7.260081	46 16	6.53
37926.0	345.97	4	93.3133 4	66.8139 6	-.007913 6	.9040 1	13.8701415 8	.26E-6 6	7.260224	45 16	7.13
37928.0	344.56	4	88.4629 5	66.8136 7	-.007904 6	.6444 1	13.8701398 8	.14E-6 7	7.260295	45 16	6.88
37930.0	343.17	4	83.6124 6	66.8136 7	-.007890 7	.3847 1	13.8701412 7	.56E-6 12	7.260396	45 16	6.86
37932.0	341.80	4	78.7624 4	66.8131 7	-.007879 6	.1250 1	13.8701455 7	-.83E-6 7	7.260475	48 16	6.45
37934.0	340.31	6	73.9121 4	66.8133 8	-.007873 7	.8656 2	13.8701486 7	.48E-6 7	7.260514	49 16	7.11
37936.0	339.1	1	69.0620 5	66.816 2	-.00786 1	.6055 3	13.8701498 7	.28E-6 8	7.260636	47 16	7.04
37938.0	337.3	2	64.2126 7	66.816 2	-.00788 3	.3467 6	13.870148 2	.3E-7 14	7.260482	48 16	7.82
37940.0											
37966.0	316.22	4	351.4702 9	66.817 1	-.007785 4	.4531 1	13.8701967 3	.97E-7 45	7.261146	71 16	5.98
37968.0											

1 September - 31 October 1962

T (MD)	$\omega$	$\Omega$	1	e	M	n	$n'/2$	q	N	D	$\sigma$
37970.0	314.78	3	346.6210	6	66.8158	9	.007786	5	.19363	9	7.261136
37972.0	313.40	3	341.7705	4	66.8158	8	.007786	5	.93402	7	7.261136
37974.0	311.99	3	336.9205	3	66.8153	6	.007792	4	.67447	7	7.261097
37976.0	310.60	2	332.0699	3	66.8152	5	.007793	4	.41490	6	7.261088
37978.0	309.19	3	327.2196	3	66.8155	5	.007798	5	.15537	7	7.261046
37980.0	307.77	3	322.3694	3	66.8154	6	.007798	5	.89588	8	7.261043
37982.0	306.37	4	317.5194	3	66.8157	6	.007799	5	.6363	1	7.261037
37984.0	304.97	4	312.6694	4	66.8155	6	.007793	5	.3768	1	7.261081
37986.0	303.57	4	307.8193	4	66.8154	6	.007786	4	.1172	1	7.261130
37988.0	302.16	4	302.9687	4	66.8145	6	.007771	4	.8577	1	7.261244
37990.0	300.79	4	298.1186	5	66.8146	8	.007754	5	.5981	1	7.261362
37992.0	299.50	5	293.2671	6	66.810	1	.007747	5	.3383	1	7.261412
37994.0	297.94	6	288.416	2	66.811	3	.00776	1	.0792	2	7.261333
37996.0	296.53	7	283.563	3	66.807	4	.00777	2	.8198	2	7.261271
37998.0	295.11	8	278.710	3	66.805	4	.00781	2	.5603	2	7.260918
38000.0	293.69	8	273.862	3	66.808	4	.00779	3	.3009	2	7.261069
38002.0	292.4	2	269.011	4	66.807	5	.00792	8	.0410	4	7.260146
38004.0	290.6	3	264.163	5	66.810	6	.0078	1	.7827	8	7.261352
38006.0	289.1	3	259.315	5	66.811	5	.00770	9	.5236	7	7.261720
38008.0	287.6	3	254.466	4	66.812	5	.00768	8	.2642	7	7.261877
38010.0	286.1	4	249.610	5	66.806	5	.00768	9	.0049	9	7.261923
38012.0	284.6	3	244.764	4	66.810	4	.00763	7	.7457	8	7.262277
38014.0	283.63	2	239.9184	4	66.8134	3	.007709	7	.48514	6	7.261684
38016.0	282.12	3	235.0693	4	66.8137	4	.007692	9	.22599	9	7.261807
38018.0	280.67	2	230.2204	3	66.8143	3	.007692	6	.96663	6	7.261806
38020.0	279.29	2	225.3707	2	66.8141	3	.007692	5	.70711	5	7.261805
38022.0	277.86	2	220.5208	2	66.8139	3	.007692	6	.44773	7	7.261811
38024.0	276.35	3	215.6708	4	66.8138	4	.007704	8	.18858	8	7.261722
38026.0	274.88	3	210.8206	5	66.8138	5	.007706	8	.92931	9	7.261702
38028.0	273.39	3	205.9706	5	66.8137	6	.007705	7	.67008	9	7.261712

T (MJD)	$\omega$	$\Omega$	1	e	M	n	$n'/2$	q	N	D	$\sigma$
37864.0	28.58 4	243.8381 2	66.8135 3	.008150 4	.4982 1	13.86888882 3	.56E-6 6	7.258933	68 16	4.71	
37866.0	27.20 4	238.9896 2	66.8134 3	.008138 4	.2359 1	13.86888886 3	.25E-6 4	7.259014	70 16	5.27	
37868.0	25.88 4	234.1410 2	66.8133 4	.008141 4	.9735 1	13.86888887 5	.14E-6 4	7.258996	66 16	5.61	
37870.0	24.46 4	229.2923 3	66.8131 4	.008131 3	.7113 1	13.86888886 4	.13E-6 5	7.259069	70 16	5.02	
37872.0	23.12 3	224.4434 2	66.8129 3	.008126 3	.44894 7	13.8688890 4	.25E-6 3	7.259107	73 16	4.74	
37874.0	21.69 3	219.5947 2	66.8128 3	.008123 3	.18683 8	13.8688913 4	.31E-6 3	7.259124	69 16	4.88	
37876.0	20.29 3	214.7461 2	66.8134 3	.008117 3	.92459 8	13.8688938 4	.33E-6 2	7.259170	67 16	4.15	
37878.0	18.91 3	209.8973 2	66.8132 2	.008110 3	.66233 7	13.8688950 2	.18E-6 3	7.259220	67 16	3.72	
37880.0	17.48 3	205.0485 2	66.8135 2	.008105 2	.40020 7	13.8688951 2	.56E-7 41	7.259253	68 16	3.67	
37882.0	16.18 4	200.2000 2	66.8131 2	.008107 3	.13777 1	13.8688951 2	.12E-6 3	7.259244	71 16	3.91	
37884.0											
37914.0											
37916.0	353.0 2	117.7748 7	66.814 1	.00804 1	.6787 6	13.868951 1	.92E-6 9	7.259705	32 16	5.33	
37918.0	351.60 4	112.9257 4	66.8134 8	.008020 8	.4165 1	13.8689566 5	.70E-6 6	7.259859	38 16	6.16	
37920.0	350.20 3	108.0768 3	66.8124 6	.008008 6	.15433 8	13.8689610 5	.60E-6 6	7.259944	41 16	5.96	
37922.0	348.79 3	103.2276 3	66.8124 6	.007995 7	.89220 8	13.8689625 6	.28E-6 5	7.260040	38 16	6.51	
37924.0	347.32 3	98.3788 4	66.8134 6	.007971 8	.63023 9	13.8689615 7	.55E-7 57	7.260214	34 16	7.17	
37926.0	345.87 3	93.5297 3	66.8137 5	.007965 8	.36821 7	13.8689601 6	.23E-7 71	7.260255	44 16	6.65	
37928.0	344.42 2	88.6806 3	66.8128 5	.007953 6	.10618 7	13.8689594 6	.16E-6 6	7.260344	40 16	5.75	
37930.0	342.97 3	83.8312 4	66.8136 6	.007946 6	.84416 8	13.8689617 5	.55E-7 56	7.260395	45 16	6.83	
37932.0	341.54 3	78.9814 5	66.8143 6	.007937 7	.58211 9	13.8689620 6	.12E-6 8	7.260461	39 16	7.90	
37934.0	340.13 5	74.1328 5	66.8139 7	.007922 8	.3200 1	13.8689628 8	.15E-6 7	7.260571	44 16	8.15	
37936.0	338.57 8	69.2840 5	66.813 1	.00792 1	.0583 2	13.868963 1	.25E-6 14	7.260591	36 16	8.04	
37938.0	336.9 2	64.4346 8	66.814 2	.00795 3	.7968 5	13.868962 2	.28E-6 10	7.260389	43 16	7.29	
37940.0	335.4 2	59.585 1	66.814 2	.00796 5	.5349 6	13.868963 2	.66E-6 7	7.260298	44 16	7.64	
37942.0											
37966.0											
37968.0	315.8 2	351.7071 7	66.816 1	.007846 6	.8650 5	13.8689258 3	.52E-6 4	7.261145	50 16	4.16	

T (MJD)	w	$\Omega$	i	e	M	n	$n'/2$	q	N	D	$\sigma$
37970.0	314.50 4	346.8584 5	66.8160 9	.007844 4	.6027 1	13.8689279 3	.33E-6 5	7.261152	49 16	3.87	
37972.0	313.00 3	342.0100 3	66.8144 5	.007833 3	.34091 7	13.8689300 3	.41E-6 3	7.261236	48 16	4.25	
37974.0	311.59 2	337.1605 2	66.8137 3	.007824 3	.07883 6	13.8689306 3	.38E-6 2	7.261301	54 16	4.35	
37976.0	310.19 2	332.3110 2	66.8136 3	.007819 4	.81674 5	13.8689324 3	.42E-6 3	7.261337	59 16	4.17	
37978.0	308.77 2	327.4614 2	66.8134 3	.007809 4	.55473 6	13.8689348 3	.24E-6 3	7.261412	69 16	5.39	
37980.0	307.35 3	322.6125 3	66.8135 4	.007809 5	.29267 8	13.8689358 4	.15E-6 4	7.261410	72 16	6.69	
37982.0	305.96 3	317.7631 3	66.8133 4	.007803 5	.03056 9	13.8689359 3	.64E-7 53	7.261454	70 16	6.83	
37984.0	304.55 3	312.9139 4	66.8134 4	.007791 4	.7685 1	13.8689346 4	.14E-6 12	7.261538	66 16	7.13	
37986.0	303.13 4	308.0647 4	66.8133 4	.007782 4	.5065 1	13.8689366 7	.86E-6 28	7.261608	57 16	6.23	
37988.0	301.73 5	303.2145 5	66.8132 5	.007768 6	.2444 1	13.8689374 8	.57E-6 8	7.261705	52 16	7.35	
37990.0	300.33 5	298.3654 4	66.8128 6	.00776 1	.9823 1	13.868945 1	.61E-6 8	7.261755	45 16	6.49	
37992.0	299.01 6	293.5160 6	66.8125 9	.00776 2	.7200 2	13.868947 1	.26E-6 9	7.261785	30 16	6.60	
37994.0	297.7 1	288.6666 1	66.812 2	.00774 3	.4578 3	13.868947 2	.24E-6 6	7.261901	19 16	6.18	
37996.0	295.6 2	283.8005 5	66.797 6	.00769 9	.1975 5	13.868943 3	.1E-7 69	7.262245	17 16	8.73	
37998.0	294.1 1	278.954 4	66.795 6	.00741 9	.9356 4	13.868958 4	.19E-6 2	7.264300	19 16	6.73	
38000.0	292.7 1	274.104 4	66.795 5	.00746 6	.6754 3	13.868959 3	.15E-6 9	7.263937	25 16	6.21	
38002.0	291.3 1	269.254 4	66.796 5	.00753 5	.4116 3	13.868960 3	.28E-6 10	7.263458	25 16	6.13	
38004.0	290.7 3	264.423 4	66.814 4	.00785 9	.1473 7	13.868951 3	.46E-6 6	7.261071	24 16	3.76	
38006.0	289.5 2	259.570 3	66.811 3	.00789 6	.8847 6	13.868954 1	.27E-6 7	7.260805	21 16	2.94	
38008.0	287.8 2	254.723 4	66.811 4	.00783 6	.6235 6	13.868956 1	.19E-6 5	7.261270	23 16	3.37	
38010.0	286.3 3	249.876 3	66.812 3	.00780 6	.3618 7	13.868954 8	.36E-6 4	7.261484	26 16	3.71	
38012.0	284.52 6	245.027 1	66.813 1	.00770 2	.1008 2	13.8689572 7	.41E-6 5	7.262214	30 16	4.54	
38014.0	283.08 5	240.179 1	66.813 1	.00770 2	.8388 1	13.868956 7	.32E-6 4	7.262193	28 16	4.56	
38016.0	281.69 6	235.331 1	66.813 1	.00770 2	.5768 2	13.868962 1	.36E-6 11	7.262203	27 16	5.68	
38018.0	280.26 6	230.4819 9	66.813 1	.00771 1	.3148 2	13.868963 2	.26E-6 11	7.262136	27 16	5.65	
38020.0	278.83 5	225.6332 7	66.812 1	.00772 1	.0529 2	13.868963 2	.33E-6 68	7.262077	25 16	5.70	
38022.0	277.42 4	220.7847 5	66.8126 9	.00772 1	.7908 1	13.868965 1	.50E-6 6	7.262059	25 16	5.75	
38024.0	275.96 5	215.9362 6	66.812 1	.00774 2	.5290 1	13.868969 1	.50E-7 84	7.261939	25 16	6.58	
38026.0	274.59 3	211.0880 4	66.8121 6	.007732 7	.26687 9	13.8689700 6	.25E-6 5	7.261960	26 16	4.60	
38028.0	273.06 5	206.2393 6	66.8128 9	.00776 1	.0052 1	13.868968 1	.13E-7 99	7.261788	29 16	7.20	

Satellite 1961 Alpha Delta 1

SAO Smoothed Elements

The following elements are based on 551 observations and are valid for the period March 9 through March 31, 1962.

$$T_0 = 37744.0 \text{ MJD}$$

$$\omega = (242^{\circ}451 \pm 8) - (9821 \pm 8)t + 3^{\circ}7069 \cos \omega$$

$$\Omega = (327^{\circ}93045 \pm 9) + (21054 \pm 1)t - .0001 \cos \omega$$

$$i = (95^{\circ}8644 \pm 1) + .0001 \sin \omega$$

$$e = (.012098 \pm 3) + .0007820 \sin \omega$$

$$M = (.60871 \pm 2) + (8.676678 \pm 2)t + (.36 \pm 6) \times 10^{-7}t^2 \\ + (.169 \pm 9) \times 10^{-7}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 12''$ .

The following elements are based on 408 observations and are valid for the period April 1 through April 30, 1962.

$$T_0 = 37770.0 \text{ MJD}$$

$$\omega = (216^{\circ}85 \pm 2) - (981 \pm 1)t + 3^{\circ}7069 \cos \omega$$

$$\Omega = (333^{\circ}4008 \pm 1) + (21021 \pm 1)t - .0001 \cos \omega$$

$$i = (95^{\circ}8582 \pm 2) + .0001 \sin \omega$$

$$e = (.012104 \pm 3) + .0007820 \sin \omega$$

$$M = (.20250 \pm 5) + (8.676673 \pm 4)t - (.16 \pm 4) \times 10^{-7}t^2 \\ + (.54 \pm 42) \times 10^{-9}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 13''$ .

The following elements are based on 420 observations and are valid for the period May 1 through May 31, 1962.

$$T_0 = 37800.0 \text{ MJD}$$

$$\omega = (187^\circ 599 \pm 7) - (9715 \pm 7)t + 3^\circ 7069 \cos \omega$$

$$\Omega = (339^\circ 70376 \pm 9) + (209972 \pm 8)t - 00001 \cos \omega$$

$$i = (95^\circ 8526 \pm 2) + 00001 \sin \omega$$

$$e = (.012120 \pm 1) + .0007820 \sin \omega$$

$$M = (.50224 \pm 2) + (8.676647 \pm 2)t - (.39 \pm 3) \times 10^{-7}t^2 \\ + (.36 \pm 3) \times 10^{-8}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 12''$ .

The following elements are based on 248 observations and are valid for the period June 1 through June 30, 1962.

$$T_0 = 37831.0 \text{ MJD}$$

$$\omega = (157^\circ 438 \pm 6) - (9703 \pm 6)t + 3^\circ 7065 \cos \omega$$

$$\Omega = (346^\circ 2107 \pm 1) + (20986 \pm 1)t - 00001 \cos \omega$$

$$i = (95^\circ 8493 \pm 2) + 00001 \sin \omega$$

$$e = (.012132 \pm 2) + .0007820 \sin \omega$$

$$M = (.47841 \pm 2) + (8.676643 \pm 2)t - (.22 \pm 4) \times 10^{-7}t^2 \\ + (.24 \pm 5) \times 10^{-8}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 10''$ .

The following elements are based on 577 observations and are valid for the period July 1 through July 31, 1962.

$$T_0 = 37860.0 \text{ MJD}$$

$$\omega = (129^\circ 220 \pm 8) - (9769 \pm 6)t + 3^\circ 7069 \cos \omega$$

$$\Omega = (352^\circ 29756 \pm 6) + (209994 \pm 7)t - 00001 \cos \omega$$

$$i = (95^\circ 8535 \pm 1) + 00001 \sin \omega$$

$$e = (.012112 \pm 3) + .0007820 \sin \omega$$

$$M = (.10126 \pm 2) + (8.676661 \pm 2)t + (.21 \pm 2) \times 10^{-7}t^2 \\ + (.62 \pm 27) \times 10^{-9}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 10''$ .

The following elements are based on 432 observations and are valid for the period August 1 through August 31, 1962.

$$T_0 = 37892.0 \text{ MJD}$$

$$\omega = (97^\circ 917 \pm 6) - (^\circ 9839 \pm 6)t + 3^\circ 7069 \cos \omega$$

$$\Omega = (359^\circ 0217 \pm 1) + (^\circ 21020 \pm 1)t - 90001 \cos \omega$$

$$i = (95^\circ 8599 \pm 2) + 90001 \sin \omega$$

$$e = (.012092 \pm 5) + .0007820 \sin \omega$$

$$M = (.75451 \pm 2) + (8.676680 \pm 2)t - (.32 \pm 30) \times 10^{-8}t^2 \\ - (.24 \pm 4) \times 10^{-8}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 12''$ .

The following elements are based on 218 observations and are valid for the period September 1 through September 30, 1962.

$$T_0 = 37923.0 \text{ MJD}$$

$$\omega = (67^\circ 45 \pm 1) - (^\circ 9805 \pm 9)t + 3^\circ 7069 \cos \omega$$

$$\Omega = (5^\circ 5441 \pm 2) + (^\circ 21046 \pm 2)t - 90001 \cos \omega$$

$$i = (95^\circ 8648 \pm 1) + 90001 \sin \omega$$

$$e = (.012070 \pm 5) + .0007820 \sin \omega$$

$$M = (.73145 \pm 4) + (8.676669 \pm 2)t - (.41 \pm 4) \times 10^{-7}t^2 \\ - (.11 \pm 6) \times 10^{-8}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 11''$ .

The following elements are based on 116 observations and are valid for the period October 1 through October 31, 1962.

$$T_0 = 37952.0 \text{ MJD}$$

$$\omega = (39^\circ 20 \pm 2) - (^\circ 978 \pm 1)t + 3^\circ 7069 \cos \omega$$

$$\Omega = (11^\circ 6483 \pm 3) + (^\circ 21048 \pm 2)t - 90001 \cos \omega$$

$$i = (95^\circ 8654 \pm 3) + 90001 \sin \omega$$

$$e = (.012089 \pm 5) + .0007820 \sin \omega$$

$$M = (.35432 \pm 5) + (8.676662 \pm 4)t - (.44 \pm 68) \times 10^{-8}t^2 \\ - (.20 \pm 7) \times 10^{-8}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 10''$ .

The following elements are based on 177 observations and are valid for the period November 1 through November 30, 1962.

$$T_0 = 37984.0 \text{ MJD}$$

$$\omega = (7^{\circ}78 \pm 3) - (9^{\circ}978 \pm 3)t + 3^{\circ}7069 \cos \omega$$

$$\Omega = (18^{\circ}3819 \pm 2) + (0^{\circ}21019 \pm 2)t - 0^{\circ}0001 \cos \omega$$

$$i = (95^{\circ}8596 \pm 2) + 0^{\circ}0001 \sin \omega$$

$$e = (.012062 \pm 2) + .0007820 \sin \omega$$

$$M = (.00779 \pm 7) + (8.676663 \pm 9)t + (.21 \pm 6) \times 10^{-7}t^2 \\ - (.30 \pm 6) \times 10^{-8}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 11''$ .

The following elements are based on 390 observations and are valid for the period December 1 through December 31, 1962.

$$T_0 = 38014.0 \text{ MJD}$$

$$\omega = (338^{\circ}39 \pm 2) - (9^{\circ}972 \pm 2)t + 3^{\circ}7069 \cos \omega$$

$$\Omega = (24^{\circ}6851 \pm 1) + (0^{\circ}21007 \pm 1)t - 0^{\circ}0001 \cos \omega$$

$$i = (95^{\circ}8545 \pm 2) + 0^{\circ}0001 \sin \omega$$

$$e = (.012074 \pm 2) + .0007820 \sin \omega$$

$$M = (.30781 \pm 6) + (8.676646 \pm 5)t + (.59 \pm 3) \times 10^{-7}t^2 \\ - (.81 \pm 39) \times 10^{-9}t^3 - .0100850 \cos \omega$$

Standard error of one observation:  $\sigma = \pm 12''$ .

<sup>T</sup> (MD)	<sup>w</sup>	<sup>Ω</sup>	<sup>i</sup>	<sup>e</sup>	<sup>M</sup>	<sup>n</sup>	<sup>n'/2</sup>	<sup>q</sup>	<sup>N</sup>	<sup>D</sup>	<sup>σ</sup>
37736.0	249.066 7	326.2460 1	95.8653 1	.011363 4	*19867 2	8.6766653 1	-37E-6 5	9.891329	229	8	2.21
37738.0	248.343 7	326.6670 1	95.8656 1	.011374 3	*55237 2	8.6766636 1	-52E-6 5	9.891221	250	8	2.34
37740.0	244.895 8	327.0882 1	95.8657 2	.011377 4	*90604 2	8.6766624 1	-29E-6 6	9.891187	208	8	2.46
37742.0	242.81 1	327.5096 1	95.8657 2	.011394 4	*25971 3	8.6766612 1	-18E-6 6	9.891019	176	8	2.57
37744.0	240.71 1	327.9310 2	95.8649 2	.011403 5	.61345 4	8.6766616 1	-25E-6 7	9.890931	150	8	2.82
37746.0	238.64 2	328.3516 2	95.8629 2	.011416 5	.96708 5	8.6766635 2	-64E-6 7	9.890794	150	8	2.90
37748.0	236.59 1	328.7731 1	95.8624 2	.011435 4	*32067 4	8.6766648 1	-12E-6 7	9.890608	196	8	2.75
37750.0	234.52 1	329.1939 1	95.8620 2	.011447 4	*67433 4	8.6766647 2	-22E-6 7	9.890484	199	8	2.74
37752.0	232.46 2	329.6146 1	95.8620 2	.011467 4	*02794 4	8.6766634 1	-34E-6 6	9.890282	191	8	2.61
37754.0	230.39 2	330.0354 1	95.8623 2	.011483 5	.38160 5	8.6766610 1	-67E-6 6	9.890125	160	8	2.71
37756.0	228.33 3	330.4563 2	95.8620 3	:011512 7	*73521 8	8.6766600 2	-14E-6 7	9.889840	120	8	3.03
37758.0	226.23 3	330.8772 2	95.8616 3	.011519 7	*08894 8	8.6766612 2	-75E-6 8	9.889772	117	8	2.96
37760.0	224.19 3	331.2986 2	95.8594 3	.011534 5	*44250 8	8.6766635 2	-36E-6 7	9.889616	132	8	2.78
37762.0	222.08 3	331.7190 2	95.8593 3	.011546 5	*79625 7	8.6766642 2	-32E-7 7	9.889491	130	8	2.71
37764.0	219.99 2	332.1394 1	95.8595 2	.011563 4	*14995 7	8.6766632 1	-43E-6 6	9.889325	128	8	2.29
37766.0	217.92 2	332.5598 1	95.8595 2	.011582 4	*50359 7	8.6766617 1	-43E-6 6	9.889138	134	8	2.39
37768.0	215.85 3	332.9802 2	95.8600 2	.011603 4	*85723 8	8.6766607 2	-16E-6 7	9.888930	101	8	2.36
37770.0	213.84 3	333.4010 2	95.8596 3	.011630 5	*21071 9	8.6766607 1	-25E-6 7	9.888654	96	8	2.52
37772.0	211.79 4	333.8219 2	95.8585 3	.011651 5	*5643 1	8.6766616 2	-36E-6 8	9.888443	88	8	2.88
37774.0	209.79 5	334.2422 2	95.8573 3	.011678 6	.9178 1	8.6766627 2	-20E-6 9	9.888173	82	8	2.94
37776.0	207.76 4	334.6625 1	95.8565 3	.011700 4	*2713 1	8.6766632 1	-12E-6 7	9.887951	94	8	2.43
37778.0	205.73 4	335.0826 2	95.8560 3	.011720 4	*6248 1	8.6766631 2	-97E-7 64	9.887757	95	8	2.44
37780.0	203.79 2	335.5027 1	95.8561 3	.011750 3	*9710 6	8.6766619 1	-50E-6 7	9.887459	115	8	2.49
37782.0	201.76 2	335.9231 1	95.8559 3	.011774 3	*33162 6	8.6766603 1	-46E-6 6	9.887219	115	8	2.50
37784.0	199.79 2	336.3435 2	95.8552 3	.011801 2	*68499 5	8.6766600 2	-21E-6 8	9.886952	124	8	2.89

T (MD)	w	$\Omega$	1	e	M	n	$n'/2$	q	N	D	$\sigma$
37786.0	197.77	2	336.7641	2	95.8549	3	.011830	2	.56E-6	6	2.77
37788.0	195.77	2	337.1843	1	95.8539	3	.011864	2	.43E-6	7	2.62
37790.0	193.79	2	337.6041	1	95.8534	2	.011884	2	.22E-6	6	2.61
37792.0	191.79	1	338.0241	1	95.8535	2	.011915	2	.45E-6	7	2.54
37794.0	189.82	1	338.4439	1	95.8534	3	.011940	2	.15E-6	6	2.59
37796.0	187.83	1	338.8640	2	95.8537	3	.011966	2	.45E-6	9	2.62
37798.0	185.87	1	339.2841	2	95.8536	3	.011999	2	.12E-7	76	2.61
37800.0	183.91	1	339.7043	2	95.8526	4	.012028	3	.69E-6	9	2.80
37802.0	181.95	1	340.1244	2	95.8514	4	.012052	3	.43E-6	9	2.90
37804.0	180.004	9	340.5443	2	95.8501	3	.012075	2	.31E-6	9	2.41
37806.0	178.05	1	340.9643	2	95.8501	3	.012107	2	.64E-6	9	2.31
37808.0	179.81	1	341.3837	2	95.8504	4	.012130	3	.36E-6	11	2.51
37810.0	174.16	1	341.8034	2	95.8510	4	.012159	3	.26E-6	10	2.10
37812.0	172.247	8	342.2233	2	95.8503	3	.012182	2	.63205	2	1.96
37814.0	170.308	5	342.6430	1	95.8494	3	.012206	2	.42E-6	5	1.81
37816.0	168.378	4	343.0626	1	95.8492	2	.012222	2	.69E-6	6	1.31
37818.0	166.429	5	343.4822	1	95.8482	2	.012256	2	.86E-6	4	1.64
37820.0	164.497	5	343.9017	1	95.8479	2	.012278	3	.87E-6	6	1.29
37822.0	162.56	1	344.3216	2	95.8495	4	.012318	4	.72E-6	9	1.81
37824.0	160.66	1	344.7409	2	95.8502	4	.012352	4	.6E-7	14	2.08
37826.0	158.77	1	345.1610	2	95.8499	4	.012379	3	.10477	3	1.93
37828.0	156.88	1	345.5810	2	95.8498	4	.012406	3	.5791	3	1.96
37830.0	154.99	1	346.0007	2	95.8490	3	.012428	3	.1107	3	1.74
37832.0	153.08	1	346.4202	2	95.8490	4	.012453	3	.16428	3	2.00
37834.0	151.18	1	346.8396	2	95.8489	5	.012476	3	.51744	4	1.89
37836.0	149.26	2	347.2595	2	95.8500	4	.012498	3	.87069	5	1.86
37838.0	147.44	1	347.6795	2	95.8506	4	.012521	3	.22363	4	1.95
37840.0	145.576	9	348.0995	2	95.8503	3	.012541	2	.57670	2	1.45
37842.0	143.679	7	348.5193	1	95.8498	2	.012559	1	.92143	2	1.23
37844.0	141.809	5	348.9387	1	95.8501	2	.012580	1	.28296	2	1.13

T (MJD)	$\omega$	$\Omega$	i	e	M	n	$n'/2$	q	N	D	$\sigma$
37846.0	139.920 8	349.3582 1	95.8504 2	.012600 1	.63611 2	8.6766721 1	-.23E-6 5	9.878948	140	8	1.78
37848.0	138.069 6	349.7777 1	95.8515 1	.012613 1	.98916 2	8.6766712 1	-.35E-6 4	9.878814	174	8	1.42
37850.0	136.223 8	350.1975 1	95.8520 1	.012630 2	.34218 2	8.6766700 1	-.38E-6 3	9.878643	231	8	1.60
37852.0	134.353 9	350.6174 1	95.8528 1	.012647 2	.69527 3	8.6766690 1	-.21E-6 3	9.878477	241	8	1.40
37854.0	132.463 7	351.0375 0	95.8532 1	.012672 2	.04842 2	8.6766688 0	.11E-6 2	9.878223	231	8	*92
37856.0	130.619 7	351.4575 0	95.8528 1	.012687 2	.40144 2	8.6766700 0	.45E-6 2	9.878077	230	8	1.00
37858.0	128.747 9	351.8776 0	95.8527 1	.012705 3	.75454 3	8.6766716 1	.34E-6 3	9.877893	175	8	1.13
37860.0	126.93 1	352.2976 1	95.8525 1	.012715 4	.10749 3	8.6766722 1	-.97E-7 4	9.877798	129	6	1.22
37862.0	125.06 1	352.7173 1	95.8528 1	.012730 4	.46058 3	8.6766714 1	-.36E-6 4	9.877643	115	8	1.23
37864.0	123.30 2	353.1376 1	95.8540 2	.012725 8	.81337 7	8.6766696 1	-.67E-6 6	9.877699	60	8	1.68
37866.0	121.37 2	353.5577 1	95.8548 2	.012761 7	.16662 6	8.6766682 1	-.16E-6 5	9.877338	61	8	1.54
37868.0	119.54 2	353.9777 1	95.8553 2	.012770 6	.51962 5	8.6766687 1	.40E-6 5	9.877250	82	8	1.72
37870.0	117.71 2	354.3980 1	95.8550 2	.012775 6	.87258 4	8.6766703 1	.46E-6 5	9.877199	92	8	1.70
37872.0	115.85 1	354.8179 1	95.8552 2	.012784 6	.22565 4	8.6766716 1	.20E-6 5	9.877105	115	8	1.99
37874.0	114.02 1	355.2378 1	95.8554 2	.012787 7	.57865 4	8.6766717 1	-.11E-6 6	9.877075	114	8	2.14
37876.0	112.18 1	355.6580 1	95.8563 2	.012788 6	.93166 4	8.6766707 1	-.40E-6 6	9.877068	124	8	2.26
37878.0	110.33 1	356.0783 1	95.8571 2	.012798 6	.28469 3	8.6766690 1	-.39E-6 5	9.876968	141	8	2.19
37880.0	108.482 9	356.4987 1	95.8581 2	.012813 5	.63772 3	8.6766681 1	.19E-7 43	9.876818	134	8	1.86
37882.0	106.648 9	356.9194 1	95.8581 2	.012818 5	.99071 3	8.6766686 1	.18E-6 5	9.876762	150	8	1.94
37884.0	104.812 8	357.3400 1	95.8581 2	.012838 5	.34372 2	8.6766700 1	.38E-6 4	9.876562	149	8	1.78
37886.0	102.965 8	357.7604 1	95.8581 2	.012845 5	.69675 2	8.6766714 1	.45E-6 5	9.876494	138	8	1.88
37888.0	101.11 1	358.1807 2	95.8584 2	.012851 6	.04980 3	8.6766716 1	-.99E-7 6	9.876433	125	8	2.28
37890.0	99.26 1	358.6007 2	95.8590 2	.012857 8	.40285 3	8.6766707 2	-.39E-6 6	9.876377	107	8	2.43
37892.0	97.40 1	359.0215 2	95.8602 3	.012865 9	.75592 4	8.676670 1	-.48E-6 8	9.876273	89	8	2.58
37894.0	95.54 1	359.4422 2	95.8609 2	.012874 9	.10899 3	8.6766677 2	-.29E-6 7	9.876206	79	8	2.34
37896.0	93.712 8	359.8631 2	95.8613 2	.012870 8	.46196 2	8.6766682 2	.37E-6 7	9.876249	76	8	1.95
37898.0	91.862 6	2838 1	95.8612 2	.012838 6	.81498 2	8.6766700 1	.44E-6 5	9.876565	77	8	1.59
37900.0	90.036 7	.7043 2	95.8613 2	.012852 7	.16797 2	8.6766712 1	.23E-7 57	9.876428	87	8	1.98
37902.0	88.210 7	1.1245 2	95.8615 2	.012850 7	.52094 2	8.6766708 2	-.30E-6 6	9.876448	91	8	2.06
37904.0	86.366 7	1.5454 2	95.8625 2	.012847 6	.87397 2	8.6766690 1	-.46E-6 6	9.876472	106	8	1.97
37906.0	84.518 7	1.9662 2	95.8633 2	.012853 6	.22700 2	8.6766677 1	-.23E-6 7	9.876417	100	8	2.11

T (MJD)	$\omega$	$\Omega$	1	e	M	n	$n^{1/2}$	q	N	D	$\sigma$
37908.0	82.685 6	2.3870 2	95.8636 2	.012848 6	.57998 2	8.67666670 1	-.27E-7 58	9.876463	100	8	1.77
37910.0	80.849 6	2.8080 2	95.8638 2	.012849 5	.93298 2	8.67666676 1	-.20E-6 6	9.876458	92	8	1.65
37912.0	78.997 8	3.2288 2	95.8636 2	.012834 6	.28602 2	8.67666684 1	.24E-6 6	9.876607	86	8	1.78
37914.0	77.167 9	3.6498 2	95.8634 2	.012828 6	.63900 2	8.67666696 1	.32E-6 6	9.876668	85	8	1.74
37916.0	75.32 1	4.0705 2	95.8634 2	.012816 6	.99204 3	8.67666703 2	.13E-6 8	9.876782	72	8	1.73
37918.0	73.47 1	4.4905 3	95.8635 2	.012803 7	.34509 3	8.67666696 2	-.34E-6 8	9.876918	66	8	1.82
37920.0	71.63 2	4.9120 3	95.8649 3	.012801 8	.69807 5	8.67666675 2	-.56E-6 10	9.876933	58	8	2.09
37922.0	69.77 2	5.3337 3	95.8661 3	.012792 9	.05113 6	8.67666666 2	-.33E-7 88	9.877023	46	8	1.99
37924.0	67.95 2	5.7541 2	95.8658 2	.012790 8	.40410 6	8.67666665 2	.27E-6 9	9.877046	46	8	1.84
37926.0	66.10 2	6.1753 2	95.8654 2	.012777 8	.76148 6	8.67666683 2	.35E-6 10	9.877176	54	8	2.05
37928.0	64.28 2	6.5966 3	95.8650 2	.012773 8	.11009 6	8.67666692 2	.69E-7 88	9.877218	44	8	1.90
37930.0	62.45 3	7.0174 3	95.8652 3	.012765 9	.46308 7	8.67666687 2	-.27E-6 10	9.877300	39	8	2.05
37932.0	60.58 3	7.4379 3	95.8662 3	.012749 9	.81615 8	8.67666672 2	-.43E-6 11	9.877460	44	8	2.30
37934.0	58.75 3	7.8584 3	95.8672 2	.012736 8	.16915 8	8.67666661 2	-.27E-6 10	9.877584	39	8	1.93
37936.0	56.87 3	8.2799 3	95.8671 2	.012718 9	.52224 9	8.67666654 3	.33E-6 15	9.877772	38	8	2.04
37938.0	54.97 3	8.7008 3	95.8669 2	.012687 8	.87542 9	8.67666672 3	.87E-6 12	9.878078	35	8	1.86
37940.0	53.20 3	9.1219 3	95.8666 3	.012687 8	.22823 9	8.67666678 3	-.4E-7 11	9.878082	25	8	1.75
37942.0	51.36 4	9.5424 4	95.8662 4	.01268 1	.5812 1	8.67666624 5	-.9E-7 19	9.878187	26	8	1.98
37944.0	49.53 3	9.9671 9	95.862 1	.01278 5	.93427 9	8.67666620 2	-.64E-7 8	9.877167	23	8	1.40
37946.0	47.67 3	10.3876 8	95.863 1	.01273 4	.28731 7	8.67666619 3	-.41E-6 1	9.877621	23	8	1.30
37948.0	45.82 3	10.8083 7	95.8637 8	.01270 4	.64033 8	8.67666604 2	-.39E-6 11	9.877943	26	8	1.35
37950.0	43.96 3	11.2281 8	95.8657 9	.01262 6	.99337 8	8.67666598 2	.12E-6 9	9.878765	27	8	1.62
37952.0	42.12 3	11.6495 6	95.8647 8	.01265 3	.34637 8	8.67666603 2	.51E-6 9	9.878426	29	8	1.37
37954.0	40.21 2	12.0714 3	95.8631 4	.012560 4	.69956 6	8.67666621 2	.31E-6 8	9.879355	39	8	1.42
37956.0	38.32 2	12.4917 3	95.8632 4	.012537 4	.05270 6	8.67666636 3	.54E-6 13	9.879576	34	8	1.39
37958.0	36.43 2	12.9126 3	95.8632 4	.012513 5	.40586 6	8.67666628 2	-.35E-6 8	9.879818	33	8	1.39
37960.0	34.57 3	13.3325 3	95.8643 3	.012499 4	.75891 7	8.6766612 2	-.62E-6 14	9.879964	33	8	1.74
37962.0	32.68 3	13.7528 4	95.8655 4	.012478 5	.11206 8	8.6766598 3	-.14E-6 9	9.880171	29	8	1.73
37964.0	30.79 3	14.1740 4	95.8652 5	.012457 5	.46519 8	8.6766596 2	.4E-7 13	9.880389	36	8	1.88
37966.0	28.89 3	14.5944 5	95.8655 5	.012433 6	.81836 9	8.6766605 2	.31E-6 9	9.880627	36	8	1.91
37968.0	26.85 8	15.0149 8	95.8648 8	.01233 4	.1719 2	8.6766616 2	.21E-6 9	9.881614	37	8	1.47

T (MJD)	$\omega$	$\Omega$	i	e	M	n	$n^{1/2}$	q	N	D	$\sigma$
37970.0	24.99 3	15.4381 4	95.8615 5	.012354 4	.52496	8	8.6766624 2	.24E-6	8	9.881415	43 8 1.64
37972.0	23.13 3	15.8577 3	95.8619 4	.012336 3	.87803	8	8.6766628 2	-.14E-6	8	9.881596	41 8 1.73
37974.0	21.20 3	16.2781 3	95.8624 3	.012306 3	.23129	8	8.6766616 2	-.49E-6	11	9.881895	44 8 1.95
37976.0	19.26 3	16.6992 3	95.8623 3	.012279 3	.58456	8	8.6766603 2	-.24E-6	9	9.882163	43 8 1.85
37978.0	17.28 5	17.1199 4	95.8622 4	.012240 3	.9380	2	8.6766591 3	-.3E-7	2	9.882551	40 8 2.63
37980.0	15.28 5	17.5407 3	95.8615 4	.012207 3	.2914	1	8.6766608 2	.62E-6	10	9.882883	49 8 2.40
37982.0	13.39 3	17.9623 2	95.8589 3	.012192 2	.64452	9	8.6766620 2	.38E-6	6	9.883030	50 8 1.53
37984.0	11.46 3	18.3816 2	95.8595 2	.012166 2	.99779	9	8.6766636 1	.39E-7	56	9.883292	67 8 1.61
37986.0	9.43 3	18.8019 1	95.8593 1	.012141 1	.35131	7	8.6766629 1	-.35E-6	5	9.883540	72 8 1.30
37988.0	7.54 3	19.2224 1	95.8594 2	.012115 1	.70445	7	8.6766617 2	-.48E-6	7	9.883809	70 8 1.40
37990.0	5.55 3	19.6431 2	95.8595 2	.012090 1	.05786	9	8.6766600 5	-.38E-6	14	9.884057	51 8 1.31
37992.0	3.64 4	20.0636 5	95.8595 2	.012063 2	.4111	1	8.676662 3	.35E-6	58	9.884323	29 8 1.34
37994.0	1.72 8	20.4840 3	95.8580 5	.012043 4	.7643	2	8.6766615 2	.59E-6	42	9.884526	20 8 2.09
37996.0	359.72 5	20.9035 6	95.8561 3	.012014 3	.1177	1	8.6766667 3	-.53E-6	6	9.884808	31 8 1.64
37998.0	357.78 4	21.3243 2	95.8558 3	.011987 3	.4710	1	8.6766649 7	.7E-7	20	9.885081	65 8 2.03
38000.0	355.80 4	21.7443 2	95.8558 3	.011961 2	.8244	1	8.6766648 2	-.36E-6	8	9.885345	94 8 2.02
38002.0	353.81 3	22.1646 1	95.8561 2	.011931 2	.17782	9	8.6766632 1	-.60E-6	5	9.885643	114 8 1.98
38004.0	351.83 3	22.5848 1	95.8561 2	.011908 2	.53121	9	8.6766620 1	-.26E-6	5	9.885872	115 8 2.07
38006.0	349.85 4	23.0051 1	95.8560 2	.011881 2	.8846	1	8.6766620 1	.27E-6	6	9.886149	98 8 2.12
38008.0	347.84 4	23.4253 1	95.8554 2	.011856 3	.2381	1	8.6766635 1	.50E-6	6	9.886392	96 8 2.14
38010.0	345.80 4	23.8451 1	95.8543 2	.011835 3	.5916	1	8.6766652 1	.48E-6	5	9.886608	97 8 2.19
38012.0	343.80 4	24.2649 1	95.8537 3	.011812 3	.9451	1	8.6766660 1	-.62E-7	57	9.886830	104 8 2.10
38014.0	341.80 3	24.6849 1	95.8538 2	.011786 3	.29854	8	8.6766654 1	-.27E-6	5	9.887089	123 8 1.98
38016.0	339.79 3	25.1047 1	95.8538 2	.011763 3	.65201	9	8.6766642 1	-.33E-6	4	9.887327	120 8 1.95
38018.0	337.91 2	25.5248 2	95.8539 3	.011730 2	.00511	5	8.6766634 1	-.14E-6	5	9.887652	121 8 2.13
38020.0	335.90 2	25.9451 2	95.8539 3	.011705 3	.35860	5	8.6766634 1	.18E-6	5	9.887909	114 8 2.13
38022.0	333.89 2	26.3651 2	95.8533 3	.011682 3	.71206	5	8.6766648 1	.47E-6	7	9.888132	98 8 2.28
38024.0	331.88 2	26.7852 2	95.8529 4	.011666 3	.06554	5	8.6766663 2	.42E-6	8	9.888293	87 8 2.32
38026.0	329.80 4	27.2050 2	95.8524 4	.011654 6	.4192	1	8.6766675 2	.23E-6	7	9.888416	73 8 2.23
38028.0	327.85 2	27.6243 2	95.8520 3	.011623 3	.77253	5	8.6766671 2	-.32E-7	7	9.888721	61 8 2.11

T (MJD)	w	Ω	1	e	M	n	n'/2	q	N D σ
37862.0	177.997	1	191.3058 5	44.7929 5	.242076 4	.520804 3	9.126130 2	.153E-5 8	7.330707
37864.0	181.966	2	187.5875 6	44.7931 6	.242046 3	.773078 3	9.126140 2	.43E-6 11	7.330992
37866.0	185.936	3	183.8698 8	44.7936 6	.242018 4	.025353 6	9.126138 2	-.54E-6 20	7.331268
37868.0	189.934	6	180.1513 8	44.798 1	.24201 1	.277567 9	9.1261229 9	-.109E-5 9	7.331395
37870.0	193.892	3	176.4386 9	44.7942 4	.241930 9	.529826 5	9.126118 2	-.57E-6 10	7.332129
37872.0	197.875	2	172.7188 3	44.7952 3	.241909 4	.782051 3	9.126122 1	.25E-6 15	7.332328
37874.0	201.851	1	169.0008 4	44.7961 3	.241882 3	.034282 2	9.126119 1	-.66E-7 86	7.332590
37876.0	205.829	1	165.2832 7	44.7972 4	.241860 3	.286509 3	9.126118 1	-.45E-6 7	7.332802
37878.0	209.807	1	161.5672 7	44.7984 3	.241847 3	.538736 2	9.126117 1	.43E-6 10	7.332929
37880.0	213.786	1	157.8523 6	44.8006 2	.241836 3	.790965 2	9.1261197 7	.57E-7 57	7.333038
37882.0	217.7650	8	154.1351 5	44.8013 2	.241820 2	.043197 2	9.1261209 9	-.64E-6 5	7.333189
37884.0	221.7449	6	150.4182 3	44.8013 2	.241804 2	.295422 1	9.1261199 6	-.98E-6 5	7.333341
37886.0	225.7221	7	146.7018 3	44.8016 2	.241787 2	.547643 1	9.1261175 6	-.93E-6 5	7.333512
37888.0	229.6988	9	142.9857 3	44.8018 2	.241774 2	.799856 2	9.1261131 9	-.11E-5 1	7.333639
37890.0	233.676	1	139.2707 4	44.8024 2	.241781 2	.052060 2	9.1261090 7	-.70E-6 6	7.333575
37892.0	237.654	1	135.5548 4	44.8032 3	.241784 2	.304257 3	9.1261087 8	.44E-6 6	7.333542
37894.0	241.634	1	131.8381 4	44.8042 3	.241793 3	.556456 2	9.1261110 1	-.107E-5 7	7.333453
37896.0	245.615	1	128.1212 3	44.8037 3	.241793 2	.808659 2	9.1261148 8	.70E-6 7	7.333452
37898.0	249.595	1	124.4036 3	44.8038 3	.241787 2	.060870 2	9.1261153 7	-.47E-7 7	7.333512
37900.0	253.5755	9	120.6876 3	44.8030 3	.241799 2	.313079 2	9.1261151 7	-.131E-5 5	7.333394
37902.0	257.551	1	116.9712 4	44.8033 3	.241803 2	.565284 2	9.1261100 7	-.127E-5 5	7.333355
37904.0	261.529	1	113.2544 4	44.8041 3	.241805 2	.817473 2	9.1261063 7	-.39E-6 5	7.333337
37906.0	265.508	2	109.5362 6	44.8043 4	.241819 3	.069661 3	9.126105 1	.18E-6 6	7.333209

T (MD)	$\omega$	$\Omega$	i	e	M	n	$n'/2$	q	N	D	c
37908.0	269.486 1	105.8180 4	44.8048 3	.241825 2	.321854 2	9.1261075 7	.91E-7 54	7.333152	56	8	2.92
37910.0	273.467 1	102.1001 4	44.8045 2	.241837 2	.574044 2	9.1261046 7	.38E-7 35	7.333029	60	8	2.53
37912.0	277.4470 8	98.3823 2	44.8045 2	.241844 2	.826233 2	9.1261024 8	-.39E-6 5	7.332964	64	8	2.31
37914.0	281.426 1	94.6651 3	44.8046 2	.241855 2	.078423 2	9.1261068 9	-.37E-6 5	7.332861	63	8	3.56
37916.0	285.402 1	90.9482 3	44.8044 3	.241863 2	.330613 2	9.1261072 9	-.34E-6 8	7.332782	67	8	3.20
37918.0	289.381 2	87.2312 4	44.8052 4	.241884 3	.582797 3	9.126098 1	-.19E-6 6	7.332586	50	8	3.67
37920.0	293.3596 7	83.5122 2	44.8051 2	.241905 1	.834979 2	9.1260985 5	.17E-6 5	7.332383	50	8	2.06
37922.0	297.342 1	79.7947 3	44.8049 2	.241937 2	.087155 2	9.126099 1	.35E-6 6	7.332067	67	8	2.88
37924.0	301.3234 7	76.0760 2	44.8050 2	.241955 1	.339338 1	9.1261002 6	.8E-8 48	7.331891	76	8	2.14
37926.0	305.3029 7	72.3581 2	44.8049 2	.241968 1	.591524 1	9.1261024 7	-.68E-6 5	7.331770	89	8	2.24
37928.0	309.2817 9	68.6400 2	44.8049 2	.241984 1	.843706 2	9.1260996 7	-.79E-6 4	7.331611	80	8	2.38
37930.0	313.2580 7	64.9229 2	44.8050 2	.242007 1	.095886 1	9.1260978 5	-.75E-6 4	7.331397	62	8	1.83
37932.0	317.233 1	61.2040 3	44.8048 3	.242032 2	.348062 2	9.1260953 8	-.26E-6 5	7.331153	62	8	2.75
37934.0	321.2112 9	57.4856 3	44.8053 3	.242058 1	.600231 2	9.1260929 8	.13E-6 6	7.330898	67	8	2.78
37936.0	325.1900 9	53.7677 3	44.8056 3	.242085 1	.852400 2	9.1260922 7	.46E-6 5	7.330639	84	8	2.88
37938.0	329.1698 8	50.0498 2	44.8065 2	.242111 1	.104570 2	9.1260924 6	.76E-6 5	7.330388	101	8	2.56
37940.0	333.1493 7	46.3321 3	44.8067 2	.242129 1	.356750 1	9.1260991 5	.49E-6 4	7.330208	116	8	2.48
37942.0	337.1250 6	42.6158 2	44.8073 2	.242147 1	.608940 1	9.1261028 6	.13E-7 4	7.330040	125	8	2.62
37944.0	341.0991 8	38.8991 3	44.8074 2	.242168 1	.861134 2	9.1261012 8	-.55E-6 6	7.329830	119	8	3.16
37946.0	345.0745 7	35.1818 3	44.8076 1	.242199 1	.113321 2	9.1260929 7	-.108E-5 4	7.329541	110	8	2.69
37948.0	349.0511 7	31.4641 3	44.8075 1	.242240 1	.365492 2	9.1260859 6	-.115E-5 4	7.329147	108	8	2.75
37950.0	353.0326 8	27.7476 3	44.8077 1	.242280 1	.617643 2	9.1260827 8	-.35E-6 5	7.328763	109	8	2.98
37952.0	357.0097 7	24.0307 3	44.8076 1	.242308 1	.869800 2	9.1260835 8	.113E-5 4	7.328486	104	8	2.63
37954.0	*9842 7	20.3132 3	44.8071 1	.242333 1	.121974 1	9.1260897 6	.138E-5 4	7.328244	114	8	2.49
37956.0	4.9579 8	16.5956 3	44.8066 1	.242353 1	.374163 2	9.1260971 6	.117E-5 4	7.328042	96	8	2.17
37958.0	8.930 1	12.8784 3	44.8058 2	.242390 1	.626361 2	9.1260998 9	.23E-6 6	7.327684	81	8	2.73
37960.0	12.9034 9	9.1607 2	44.8051 1	.242432 1	.878562 2	9.1260966 7	-.50E-6 5	7.327283	76	8	2.21
37962.0	16.874 1	5.4433 3	44.8046 2	.242425 1	.130764 2	9.1260948 8	-.66E-6 5	7.326620	73	8	2.25
37964.0	20.8504 8	1.7258 2	44.8033 2	.242519 1	.382945 2	9.1260920 5	-.35E-7 37	7.326444	104	8	2.19
37966.0	24.820 8	358.0082 3	44.8027 2	.242559 1	.635141 2	9.1260940 7	-.29E-6 5	7.326059	116	8	2.61
37968.0	28.790 8	354.2901 3	44.8019 2	.242585 1	.887342 2	9.1260972 8	.50E-6 5	7.325805	120	8	2.39

1 September - 31 October 1962

$\frac{T}{(MD)}$	$\Psi$	$\Omega$	i	e	M	n	$n^{1/2}$	q	N	D	$\sigma$
37970.0	32.759 1	350.5715 4	44.8008 2	.242607 1	.139547 2	9.1261007 8	.39E-6 4	7.325586	102	8	2.15
37972.0	36.722 1	346.8522 4	44.8008 2	.242639 1	.391767 2	9.1261020 7	.35E-6 5	7.325278	72	8	2.38
37974.0	40.692 1	343.1325 4	44.8002 2	.242668 1	.643977 2	9.1261027 9	.43E-6 5	7.324998	60	8	2.06
37976.0	44.653 1	339.4126 4	44.8003 2	.242711 2	.896207 2	9.126101 2	.28E-7 62	7.324576	60	8	2.11
37978.0	48.620 2	335.6935 4	44.8000 3	.242742 2	.148427 3	9.126104 1	.40E-6 6	7.324276	61	8	2.36
37980.0	52.605 2	331.9760 4	44.7970 3	.242752 2	.400615 3	9.126105 1	.54E-6 6	7.324187	59	8	3.14
37982.0	56.567 1	328.2577 3	44.7958 2	.242777 2	.652850 2	9.126108 1	.34E-6 6	7.323937	47	8	2.01
37984.0	60.532 1	324.5386 2	44.7953 2	.242785 1	.905089 2	9.126112 1	.68E-7 51	7.323856	58	8	2.47
37986.0	64.4973 8	320.8193 2	44.7955 2	.242790 1	.157328 2	9.1261126 7	-.39E-6 4	7.323813	67	8	2.17
37988.0	68.457 1	317.1015 2	44.7948 2	.242810 1	.409571 2	9.1261095 9	-.69E-7 47	7.323618	77	8	2.57
37990.0	72.421 1	313.3827 2	44.7943 2	.242826 2	.661809 2	9.126109 1	.11E-6 6	7.323460	79	8	2.77
37992.0	76.385 1	309.6637 2	44.7937 2	.242840 2	.914051 2	9.1261095 7	.21E-6 5	7.323330	72	8	2.56
37994.0	80.353 1	305.9441 3	44.7937 2	.242836 2	.166286 2	9.1261122 8	.89E-6 5	7.323363	63	8	2.73
37996.0	84.316 1	302.2246 3	44.7933 2	.242831 3	.418539 2	9.126120 1	.113E-5 7	7.323415	55	8	2.60
37998.0	88.278 1	298.5064 3	44.7930 2	.242812 3	.670802 2	9.1261224 7	.86E-6 5	7.323588	64	8	2.62
38000.0	92.241 1	294.7880 6	44.7932 3	.242790 3	.923071 2	9.1261125 1	.64E-7 69	7.323800	59	8	3.32
38002.0	96.200 1	291.0695 6	44.7922 3	.242782 3	.175347 2	9.126124 1	-.47E-6 9	7.323800	59	8	3.51
38004.0	100.167 2	287.3502 7	44.7923 3	.242766 3	.427607 3	9.126118 1	-.76E-6 7	7.324040	58	8	3.84
38006.0	104.136 3	283.630 1	44.7919 4	.242734 4	.679857 5	9.1261110 2	-.55E-6 9	7.324161	38	8	3.68
38008.0	108.100 3	279.913 1	44.7940 6	.242707 5	.932101 6	9.1261118 2	.11E-5 1	7.324610	37	8	5.05
38010.0	112.068 4	276.194 2	44.7937 9	.242678 6	.184356 8	9.1261217 3	.20E-5 1	7.324886	28	8	4.32
38012.0	116.027 3	272.476 1	44.7925 6	.242653 4	.436641 6	9.126128 2	.181E-5 7	7.325130	26	8	2.33
38014.0	119.996 5	268.758 1	44.7925 8	.242616 5	.68893 1	9.1261138 3	.79E-6 17	7.325475	33	8	4.15
38016.0	123.957 5	265.042 1	44.7920 7	.242586 4	.94123 1	9.1261145 3	-.19E-6 23	7.325766	32	8	4.15
38018.0	127.914 2	261.3215 6	44.7913 3	.242558 2	.293549 5	9.126135 1	-.185E-5 9	7.326045	38	8	2.97
38020.0	131.883 2	257.6036 6	44.7918 3	.242521 3	.445822 4	9.126124 1	-.20E-5 1	7.326405	35	8	3.44
38022.0	135.8467 9	253.8858 4	44.7919 2	.242484 2	.698092 2	9.1261201 9	-.10E-5 1	7.326768	27	8	1.66
38024.0	139.814 1	250.1681 4	44.7912 2	.242444 2	.950345 2	9.1261251 7	.175E-5 7	7.327155	37	8	2.53
38026.0	143.787 1	246.4539 6	44.7920 2	.242370 3	.202603 3	9.126137 1	.24E-5 1	7.327864	31	8	2.41
38028.0	147.752 2	242.7348 5	44.7917 2	.242336 3	.454904 3	9.126147 1	.211E-5 7	7.328180	35	8	2.99

## NOTICE

This series of Special Reports was instituted under the supervision of Dr. F. L. Whipple, Director of the Astrophysical Observatory of the Smithsonian Institution, shortly after the launching of the first artificial earth satellite on October 4, 1957. Contributions come from the Staff of the Observatory. First issued to ensure the immediate dissemination of data for satellite tracking, the Reports have continued to provide a rapid distribution of catalogues of satellite observations, orbital information, and preliminary results of data analyses prior to formal publication in the appropriate journals.

Edited and produced under the supervision of Mr. E. N. Hayes and Mrs. Barbara J. Mello, the reports are indexed by the Science and Technology Division of the Library of Congress, and are regularly distributed to all institutions participating in the U. S. space research program and to individual scientists who request them from the Administrative Officer, Technical Information, Smithsonian Astrophysical Observatory, Cambridge, Massachusetts 02138.